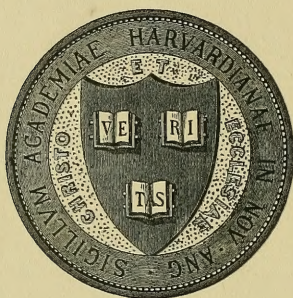


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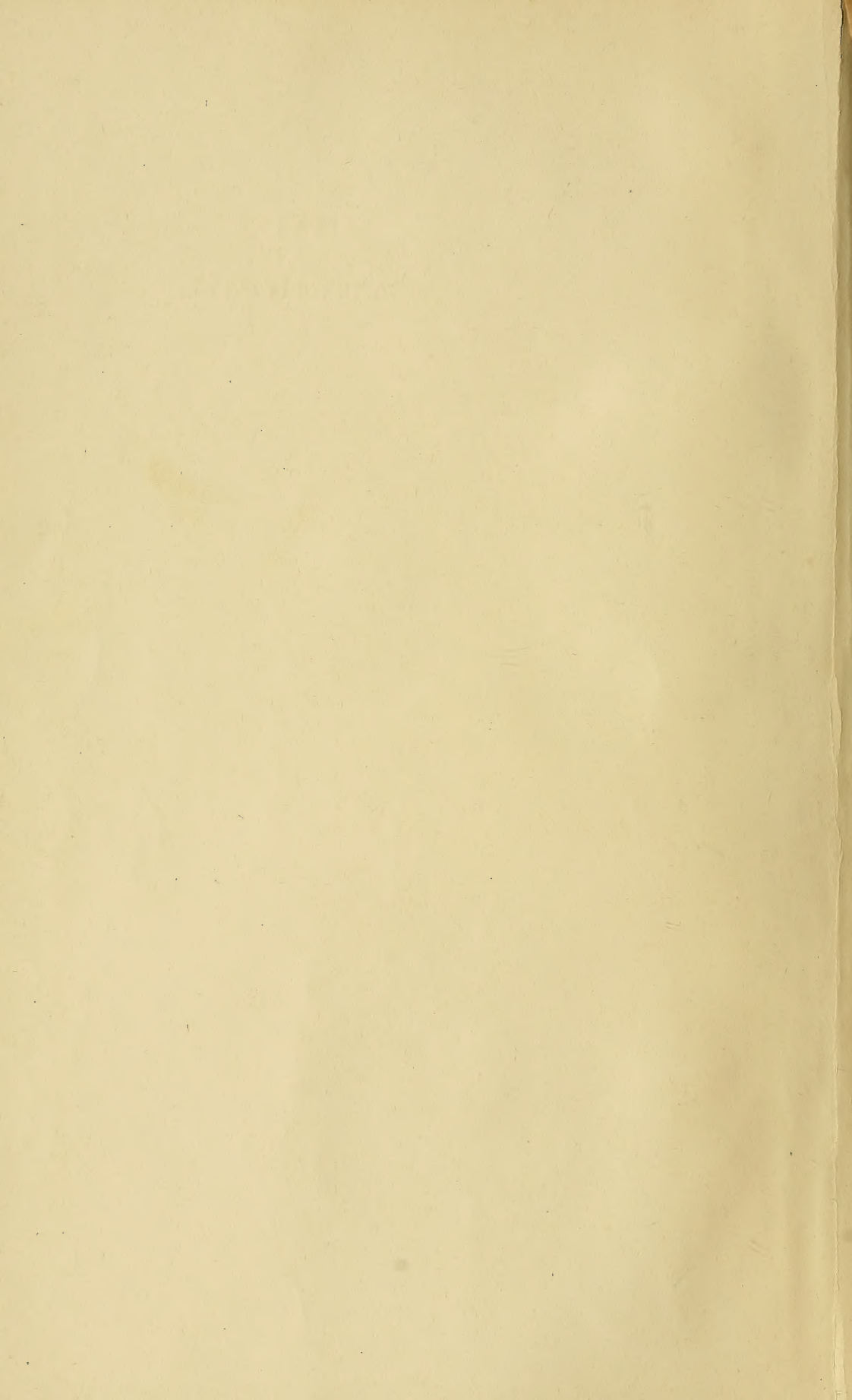
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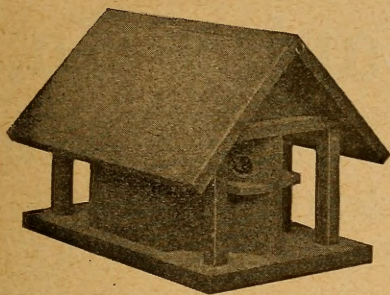
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THE CANADIAN FIELD-NATURALIST, lately THE OTTAWA NATURALIST, established thirty-seven years ago, "to publish the results of original research or investigation in all departments of natural history," is issued monthly, excepting for the months of June, July and August.

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OTTAWA, ONTARIO, JANUARY, 1925

No. 1

THE EXPERIMENTAL FARM AS A BIRD SANCTUARY

By RALPH E. DELURY



AN EXPERIMENTAL FARM, concerned as it is with all of the factors relating to agriculture, finds in its bird life an interesting and important subject for observation. The necessity of birds for the most successful operation of various branches of farming has so often been demonstrated that, for utilitarian reasons alone, the policy of protecting birds, which has always been maintained by the Directors of the Experimental Farms, is fully justified. Though the Act respecting Experimental Farm Stations* makes no explicit reference to ornithological investigations, yet provision is made to "conduct any other experiments and researches bearing upon the agricultural industry of Canada"; and now, it is understood, consideration is being given to the advisability of formulating definitely this protective policy by constituting the Experimental Farms sanctuaries under the Migratory Birds Convention Act. Bird-students and nature-lovers throughout America will welcome such procedure as a direct contribution to the cause of bird protection, as well as a stimulant to a sympathetic interest in this cause throughout the agricultural districts.

The Central Experimental Farm, on the border of the city of Ottawa, possesses a great variety of the natural and artificial conditions most desirable in a sanctuary for birds. An examination of the aerial photograph†, which pictures the easterly end of the Experimental Farm and about 500 feet of the city along the Carling Avenue boundary, reveals some of these attractions: the open water of Dow's Lake and the Rideau Canal with their edgings along the Farm of marsh and swamp; clumps of woods, deciduous and evergreen; meadows and hillsides; lawns, shrubberies and hedges; areas devoted to the cultivation of fruits, flowers, grains and vegetables. In such surroundings, many birds linger for days on their journeys north and south, and many elect to make their homes in this glorious place. There is plenty of food at all seasons of the year for migrants and resident birds,

and good shelter from enemies and from the chill winds of winter.

As previous numbers of the publications of the Field-Naturalists' Club testify, Ottawa bird-students have taken advantage of the proximity of this bird paradise to record many interesting observations. Excursions of the Club have been held to the Farm, and to "Dow's-Swamp" (4000 ft. East, 500 ft. South of the Observatory); while "Clark's Woods", as it was formerly called, near the Observatory (500 N., 200 W.), has yielded some valuable records. The swamp and woods are not so large and unfrequented as when the earliest records were made, but they still attract many birds. The small marsh below the woods along Carling Avenue (700 N., 400 E.) has been filled in partly and is nearly dry in the summer, so that it has been practically deserted as a nesting site by the Red-winged Blackbirds. On the other hand the planted trees on the Farm, especially the wide strip all along its Carling and Fisher Avenue boundaries, have grown into attractive bits of woods, and so the increasing attractions of the Farm have almost compensated for modifications in the surroundings. Also, the new hospital (3000 W., 1000 S.) will soon have its large grounds laid out, and it is hoped that a great number of trees of various kinds will be planted there. On the whole, the boundaries of the Farm will continue to be attractive to the birds, and the Farm will doubtless become more so.

The ideal nesting places in marsh, tree and meadow, as well as the nesting boxes which have been put up, especially in the arboretum, are taken advantage of by so many pairs of birds that an accurate count of their numbers is almost impossible. It is the practice among the men at the Farm to guard carefully the nests they discover on the ground and in shrubs, indicating their presence by a stake or other means, lest they be injured in the usual processes of cultivating, grass-cutting and shrub-trimming. It is inevitable, however, in spite of these highly commendable precautions, that many nests are molested; but the timing of such operations as the ploughing in of certain crops for their fertilising value could sometimes be arranged to the best advantage of the birds nesting in the field.

*Revised Statutes of Canada, 1906, c. 73.

†My thanks are due to Secretary J. A. Wilson of the Air Board for this photograph and for permission to publish it here. The photograph was taken at an elevation of 10,000 feet. Mr. C. R. Westland, who has surveyed this locality, has kindly marked in the 1000-foot lines, N, E, S, and W from the Dominion Observatory, the Geodetic zero point for Canada.



PLATE 1.

Above: Baby Killdeer, one day old. Old Killdeer on nest of four eggs.

Middle: Eastern end of Experimental Farm photographed from 10,000 feet in the air.

Below: Mother Black Duck and six young. Spotted Sandpiper on nest of four eggs, being moved by the hand after a short acquaintance.



PLATE 2.

Above: Pair of Downy Woodpeckers and nest. Meadowlark approaching nest with food for her four young.

Middle: Ruby-throated Hummingbird sipping nectar from *Cytisus Capitatus*. Female Cape May Warbler on spruce tree.

Below: Female Pine Grosbeak eating weed seeds. Bohemian Waxwing on crabapple tree.

The bird photographs reproduced herewith were taken at the Farm and are representative of its bird life. On the top of Plate 1 is shown a Killdeer on the nest in a pea-field (1200 E., 300 S.). When the young were one day out of the shell the parents led them across the road, one of the young being detained long enough to be photographed as shown. Three or four pairs of Killdeers nest on the eastern half of the Farm each year, and Spotted Sandpipers in greater numbers. The picture of the latter was taken in a plot of "Duchess" wheat after a very short acquaintance, the old bird coming back quickly to her four eggs when called by a low whistled *Leet, Leet, Leet-tee*. The Black Duck shown leading her brood nested in the enclosed marsh of the Poultry Division (2300 E., 200 N.). When the young were larger she brought them to the feeding-trough, after first chasing away the domestic fowl. In this marsh the Canada Geese which have been domesticated find natural nesting places, and usually a Bittern, two or three Florida Gallinules and many Red-winged Blackbirds nest there. At the top of Plate 2 a pair of Downy Woodpeckers are shown at their nest in the swamp beyond the Arboretum (3100 E., 1600 S.); one parent is waiting to enter with insect food for the young, while the other, having taken in food and cleaned the nest, is about to come out. The old Meadowlark pictured is striding towards her nest on the hillside (2400 E., 1400 S.), after the usual ten-minute search for moths, cutworms, etc. When her four young were banded they scurried away into the long grass and were found with difficulty. The Hummingbird is shown sucking nectar from flowers of one of the many shrubs in the Arboretum (1800 E., 1200 S.); at this point as many as 30 Ruby-throats have been seen at a Siberian Pea Tree. The female Cape May Warbler pictured is representative of the host of Warblers which loiter for days at the Arboretum (2200 E., 600 S.). At one time, ten species of Warblers were observed at the edge of a clump of evergreens where some hawthorn trees were in bloom (2600 E., 1000 S.). Pine Grosbeaks, Bohemian Waxwings and occasionally Robins find plenty of food in the winter, as many of the shrubs and trees retain their fruit. The Bohemian Waxwing is shown seated in a laden crabapple tree; while the Pine Grosbeak, having eaten apple seeds, has gone to the weeds to vary her diet (2600 E., 1200 S.).

Ninety-three species of birds have been observed at the writer's residence near the Farm (800 W., 285 N.) during the last 14 years, and these, together with others seen about the Observatory grounds and the Experimental Farm, or within a stone's throw of it, total 136. It may be noted that several additional species were observed but

not positively identified; and at least ten additional species have been previously recorded by other observers. While a thorough list of the Farm birds is desirable, it may be worth while at present to append the writer's list of those observed from 1911 to the end of 1924. In this list those seen in the writer's garden will be indicated by an asterisk.

Horned Grebe, Pied-billed Grebe, Herring Gull, Bonaparte's Gull, Hooded Merganser, Black Duck, Green-winged Teal, Canvas-back, Canada Goose, Bittern, Great Blue Heron, Green Heron, Black-crowned Night Heron, Florida Gallinule, Spotted Sandpiper, Killdeer, Ruffed Grouse, Marsh Hawk, *Sharp-shinned Hawk, Goshawk, Broad-winged Hawk, *Pigeon Hawk, *Sparrow Hawk, Barred Owl, Saw-whet Owl, *Screech Owl, Great Horned Owl, Snowy Owl, *Yellow-billed Cuckoo, *Black-billed Cuckoo, *Belted Kingfisher, *Hairy Woodpecker, *Downy Woodpecker, Arctic Three-toed Woodpecker, *Yellow-bellied Sapsucker, Red-headed Woodpecker, *Flicker, *Whip-poor-will, *Nighthawk, *Chimney Swift, *Ruby-throated Hummingbird, *Kingbird, *Crested Flycatcher, *Phoebe, Olive-sided Flycatcher, *Wood Pewee, Alder Flycatcher, *Least Flycatcher, Prairie Horned Lark, *Blue Jay, Canada Jay, *Crow, *Bobolink, *Cowbird, *Red-winged Blackbird, *Meadowlark, *Baltimore Oriole, Rusty Blackbird, *Bronzed Grackle, *Evening Grosbeak, *Pine Grosbeak, *Purple Finch, *House Sparrow, *Crossbill, *White-winged Crossbill, *Redpoll, *Goldfinch, *Pine Siskin, Snow Bunting, *Vesper Sparrow, *Savannah Sparrow, *White-crowned Sparrow, *White-throated Sparrow, *Tree Sparrow, *Chipping Sparrow, Field Sparrow, *Slate-colored Junco, *Song Sparrow, *Lincoln's Sparrow, Swamp Sparrow, Fox Sparrow, *Spowhee, *Rose-breasted Grosbeak, Indigo Bunting, *Scarlet Tanager, *Purple Martin, Cliff Swallow, *Barn Swallow, *Tree Swallow, Bank Swallow, *Bohemian Waxwing, *Cedar Waxwing, *Northern Shrike, Migrant Shrike, *Red-eyed Vireo, *Warbling Vireo, *Blue-headed Vireo, *Black and White Warbler, *Nashville Warbler, *Tennessee Warbler, Parula Warbler, *Cape May Warbler, *Yellow Warbler, *Black-throated Blue Warbler, *Myrtle Warbler, Magnolia Warbler, *Chestnut-sided Warbler, *Bay-breasted Warbler, *Black-poll Warbler, *Blackburnian Warbler, *Black-throated Green Warbler, *Pine Warbler, *Ovenbird, *Water-Thrush, *Morning Warbler, Maryland Yellow-throat, *Wilson's Warbler, *Canada Warbler, *Redstart, *Catbird, *Brown Thrasher, *House Wren, *Winter Wren, *Brown Creeper, *White-breasted Nuthatch, *Red-breasted Nuthatch, *Chickadee, *Golden-crowned Kinglet, *Ruby-crowned Kinglet, *Wood Thrush, *Veery, Gray-cheeked Thrush, *Olive-backed Thrush, *Hermit Thrush, *Robin, *Bluebird.

TRILOBITES OF THE BEEKMANTOWN IN THE PHILIPSBURG REGION OF QUEBEC

By J. H. BRADLEY, JR.



THE suggestion of Professor P. E. Raymond, the writer spent eleven weeks in the vicinity of Philipsburg, Quebec, during the summer of 1922. The time was devoted mainly to a thorough search for fossils in the Beekmantown rocks of this region. Although the great bulk of the rocks was barren, determinable fossils were found in seven separate and distinct horizons. The general results of this study were published in the *Journal of Geology** and correlations within the Beekmantown of the Champlain valley were suggested. The present paper will concern itself with the trilobites of the Philipsburg section. In the Middle and Upper Beekmantown localities of this area, brachiopods, gastropods, and cephalopods occur in some abundance, but because of the light shed upon very poorly understood genera, the trilobite fauna has received the bulk of attention. Certain of these forms will undoubtedly be of value to future investigations concerning the stratigraphy of the "Quebec Group," and in the interpretation of Beekmantown faunas in general.

ORDER OPISTHOPARIA BEECHER

FAMILY BATHYURIDAE WALCOTT

Bathyurellus Billings

Bathyurellus flabellus sp. nov.

Plate 1, fig. 7.

DESCRIPTION

Pygidium semicircular; width not quite twice the length. Axial lobe strongly convex, conical, expanding a little anteriorly, almost half the whole length; apex obtusely rounded. There are three indistinct rings, crossed by a slightly raised medial line; last ring as wide as both the others. The axial lobe, although well-defined, is small and insignificant in comparison with the rest of the pygidium. The lateral lobes have a small triangular area adjacent to the axis that stands up in sharp contrast to the general concavity of the broad border of the pygidium. The raised area around the axial lobe is marked by seven ribs on each side. These are reduced to five pairs on the concave portion. The distinctive feature of this species is that the ribs on the lateral lobes are

equally distributed over the entire expanse of pygidium, giving a fan-like appearance. No other member of the genus has ribs directly behind the axial lobe. Ribs gently convex; grooves between them gently concave. Surface apparently smooth. Head and thorax unknown.

The pygidium of *Bathyurellus flabellus* has the same general proportions as that of *B. expansus*, but differs from it in having three poorly marked axial rings instead of four well-marked rings; in having five instead of four pairs of ribs on the lateral lobes; but chiefly in not being smooth behind the axial lobe. *B. marginatus* differs from *B. flabellus* in having nearly flat lateral lobes; *B. fraternus* in possessing a wider axial lobe which is not elevated at the apex; *B. validus* in having the whole of the lateral lobes of the pygidium concave, and the axial lobe not elevated at the apex.

In 1854, Angelin in his *Palaeontologia Scandinavica* published a drawing of the pygidium of *Niobe explanata* from the Orthoceras limestone (Fågelsång limestone) of Scania. This fossil closely resembles *Bathyurellus flabellus* in having a similar fan-like pygidium with ribs directly back from the axial lobe. It is also gently concave near the posterior margin as in *Bathyurellus*. The axial lobe of *Niobe explanata* differs, however, from that of *Bathyurellus flabellus* in being larger and in possessing eight well-defined annulations:

MEASUREMENT OF PYGIDIUM

Length	Width	Length of Axial Lobe	Width of Axial Lobe
7 mm.	12.5 mm.	3 mm.	2 mm.

HORIZON AND LOCALITY

Upper Beekmantown at Philipsburg, Quebec. Holotype No. 1736 in Museum of Comp. Zoölogy, Cambridge, Mass., collected by J. Marcou.

Petigurus Raymond

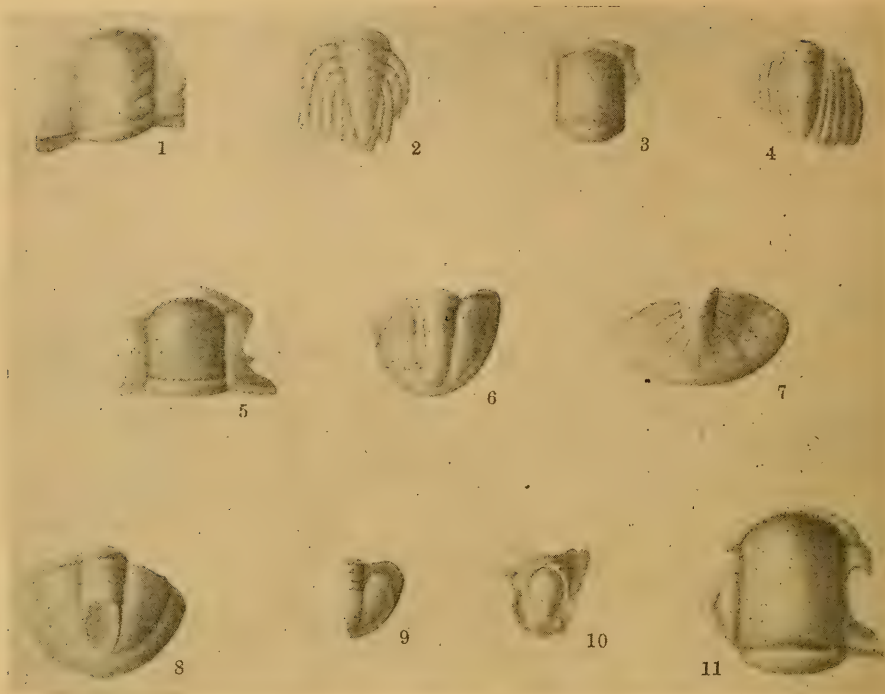
Petigurus subrectus sp. nov.

Plate 1, fig. 3.

Cf. *Bathyurus Nero* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 260, fig. 243a-d.

Cf. *Petigurus nero* Raymond, *Bull. Victoria Memorial Mus.*, 1, 1913, p. 59, pl. 7, fig. 8.

*Vol. 31, No. 4, May-June, 1923.



DESCRIPTION

Glabella oblong as in *Petigurus nero*, but differs from that form, in lacking anterior enlargement. Sides of glabella quite parallel from neck furrow forward to a point about 2 mm. from tip where sides converge rather abruptly. Dorsal furrows well defined all round glabella. Glabella not as convex as that of *Petigurus nero*. Neck segment rounded and conspicuous. Surface covered by tubercles. Known only from a single cranidium.

HORIZON AND LOCALITY

Middle Beekmantown, St. Armand, P.Q. Holotype collected by A. Hyatt from Division B5 in syncline west of St. Armand station, and now No. 1737 in the M. C. Z.

FAMILY LEIOSTEGIDAE NOV.

Genus *Leiostegium* Raymond

Bull. Victoria Mem. Mus., 1, 1913, p. 68. Genotype, *Bathyrurus quadratus* Billings.

Leiostegium cannot be placed in any family so far described. The total absence of glabellar furrows and the general smoothness of cranidium and pygidium suggest that *Leiostegium* is a terminal genus. Its possible ancestry is uncertain, however, because Cambrian forms possessing quadrate glabellae do not as a rule correspond in other important details. *Symphysurus elongatus* possesses a subquadrate glabella, lacks glabellar furrows, and has a well defined axial lobe similar

to that of *Leiostegium*. The eyes of the former are much nearer the glabella than in the latter, and it therefore cannot be looked to as a possible direct ancestor. *Iliaenurus quadratus* Hall resembles *Leiostegium* in shape of glabella, but differs in having eyes close to the glabella and a pygidium totally lacking an axial lobe.

Leiostegium is apparently unique in possessing a quadrate glabella, wide fixed cheeks, small eyes far from the glabella, the pygidium almost semi-circular, with axial lobe extending nearly the whole length. For trilobites of this type the family *Leiostegiidae* is proposed. It is possible that in the future, the ancestors of *Leiostegium* will be made known. At present, however, it is clear that *Leiostegium* cannot be included in the *Asaphidae*, *Iliaenidae* or *Bathyruridae*, largely because of the position of the eye. In any case the family *Leiostegiidae* is necessary until something more is learned of the genesis of this distinctive form.

Leiostegium quadratum (Billings)

Plate 1, fig. 5.

Bathyrurus quadratus Billings, *Canadian Nat. Geol.*, 5, 1860, fig. 27; *Geol. Canada, Geol. Surv. Canada*, 1863, p. 238, fig. 272; *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 412, fig. 396. *Leiostegium quadratum* Raymond, *Bull. Victoria Mem. Mus.*, 1, 1913, p. 68, pl. 7, fig. 17.

A few specimens of the cranidium of this species were found in a collection of gastropods and

cephalopods made by A. Hyatt from the upper members of Logan's series B at St. Armand, P.Q. The writer finds this trilobite in his collection from the conglomerate beds at Stanbridge. Heretofore *L. quadratum* has been known only from the conglomerate at Point Lévis, and the exact age of the horizon could only be inferred. It is now quite certain that it is a middle and upper Beekmantown form. Figured specimen No. 1738 in Museum of Comp. Zoölogy.

FAMILY ASAPHIDAE BURMEISTER

SUBFAMILY ASAPHINAE RAYMOND

Genus *Isoteloides* Raymond

Isoteloides whitfieldi Raymond

Asaphus canalis Whitfield (not Hall), *Bull. Amer. Mus. Nat. Hist.*, 1, 1886, p. 336, pl. 34, figs. 1-8; *ibid.*, 2, 1889, p. 64, pl. 11, 12.—Seely, *Vermont State Geol., Rep.* 7, 1910, pl. 58.

Isotelus canalis Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 291, fig. 1600.

Isoteloides whitfieldi Raymond, *Ann. Carnegie Mus.*, 7, 1910, p. 36, pl. 14, figs. 1-4; fig. 4; 7th *Rep. Vermont State Geol.*, 1910, p. 223.—Walcott, *Smithson. Misl. Colls.*, 1924, Vol. 75, No. 2, p. 58, pl. 13, fig. 6.

This species is found associated with *Lloydia saffordi* in the red-weathering beds of Division B. Two pygidia, an hypostoma and a free cheek, were found in a collection made by J. Marcou from this region. The writer does not find *Isoteloides whitfieldi* in his collection from Stanbridge, and evidence elsewhere indicates a possible upper limit to this type in the Fort Cassin horizon.

HORIZON AND LOCALITY

Fort Cassin beds of the Beekmantown: Crown Point, New York; Fort Cassin, Vermont.

Isoteloides convexus sp. nov.

Only a fragment of a pygidium is known, but it shows pronounced differences from *Isoteloides whitfieldi* and suggests the possibility of the presence of more than one species of this genus in the Beekmantown. As the name indicates, *I. convexus* differs from *I. whitfieldi* in possessing a greater convexity and a greater particular convexity of axial and pleural lobes of the pygidium. This produces deep depressions between the axial and pleural lobes so that this trilobite lacks the smoothness of *I. whitfieldi*.

HORIZON AND LOCALITY

Middle Beekmantown, Division B, Philipsburg, P.Q. Holotype No. 1739 in the M. C. Z.

FAMILY ASAPHISCIDAE RAYMOND

Lloydia saffordi (Billings)

Plate 1, figs. 9, 10.

Bathyrurus saffordi Billings, *Canadian Nat. Geol.* 5, 1860, p. 320, fig. 24; *ibid.*, 6, 1861, p. 313,

figs. 1, 2; *Geol. Canada, Geol. Surv. Canada*, 1863, p. 239, figs. 274a, b.—Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 259, figs. 241a, b; p. 411, fig. 393.

Lloydia saffordi Raymond, *Bull. Victoria Mem. Mus.*, 1, 1913, p. 66, pl. 7, fig. 16.

Lloydia saffordi occurs in abundance associated with *Macluites ponderosus* and other gastropods in the upper B series at Philipsburg. This association obtains also at Cow Head in boulders in Division P. It is likewise the most common conspicuous trilobite at Point Lévis. The writer has several specimens from the conglomerate at Stanbridge. The occurrence of this form at Stanbridge and Philipsburg marks it as a Beekmantown species. It is interesting to find *L. saffordi* in a collection recently made by Schuchert in the Williston limestone southeast of Burlington, Vermont. This is the first discovery of this arctic type in the United States. Figured specimens Nos. 1745 and 1746 in the M. C. Z.

Lloydia amplimarginata sp. nov.

Plate 1, fig. 8.

Axial lobe narrow and almost parallel sided. Rings distinct and appear to be six in number. Pleural lobes smooth and convex, separated by sharp furrows from the axis. Slight furrows separate pleural lobes from border which encircles the entire pygidium. *Lloydia amplimarginata* differs markedly from *L. saffordi*, with which it is associated, in the width of this margin. In the former, the margin is conspicuously wide, almost as wide as the axial lobe. The widest part of the margin in *L. saffordi*, directly behind the axial lobe, is never quite half as wide as the widest part of the anterior end of the axial lobe. Another striking difference between these two related forms is that the axial lobe of the present species enlarges very little, whereas that of *L. saffordi* expands forward considerably.

MEASUREMENTS OF PYGIDIUM

	Greatest Length	Greatest
Length	Width	Width of
	Border	Border
10mm.	10.5mm.	2.25 mm.
		8.75 mm.
		2.5 mm.

From these measurements, it can be seen that *Lloydia amplimarginata* is almost as long as wide. *L. saffordi* is always wider than long.

HORIZON AND LOCALITY

Middle Beekmantown, Philipsburg, P.Q.

Described from a pygidium collected by J. Marcou from Division B at Philipsburg. The holotype is No. 1740 in the M. C. Z.

Lloydia pinguis sp. nov.

Plate 1, fig. 11.

DESCRIPTION

Known from cranidia only.

Glabella very convex, much elevated above the general surface of the head, anterior angles slightly rounded, sides straight and divergent a little backward; posterior margin slightly less rounded than anterior. Neck furrow deep and broad; neck segment about twice as broad as rim which forms frontal margin. Dorsal furrows shallow. Palpebral lobes large, close to dorsal furrows, and situated half way to the front.

This form differs from *Lloydia saffordi* in its more convex glabella, which lacks the curve on the lateral margins, and the well rounded frontal angles. The glabella of *L. pinguis* is almost oblong, whereas that of *L. saffordi* narrows considerably toward the front. The entire cranidium of *Lloydia pinguis* has a more plump appearance than has that of *L. saffordi*.

MEASUREMENTS OF CRANIDIA

Length	Width	Length of Glabella	Greatest Width of Glabella	Smallest Width of Glabella
11 mm.	11.5 mm.	8 mm.	6.5 mm.	6 mm.
12 mm.	12.5 mm.	9 mm.	6.5 mm.	6 mm.

HORIZON AND LOCALITY

Middle Beekmantown, Division B, at Philipsburg, P.Q. Holotype collected by J. Marcou, and now No. 1747 in the M. C. Z.

Lloydia obscura sp. nov.

Plate 1, fig. 6.

Lloydia sp. ind. Raymond. *Bull. Victoria Mem. Mus.*, 1, 1913, pl. 7, fig. 19.

DESCRIPTION

Known from pygidia and thorax only.

Among trilobites attributed to *Lloydia saffordi* are forms with the axial lobe of the pygidium narrow, expanding forward but slightly, pygidium considerably wider than long, margin narrow. In the general proportions of the pygidium, and the lack of a conspicuous margin, *Lloydia obscura* agrees with *L. saffordi*. In the almost parallel-sided axial lobe, it is similar to *L. amplimarginata* but differs from that form in lacking the nearly equidimensional pygidium and the broad border. The thorax is yet too little known for exact description.

Length	Width	Length of Axial Lobe	Greatest Width of Axial Lobe
12 mm.	18 mm.	10 mm.	5 mm.
10 mm.	14 mm.	8 mm.	4 mm.

HORIZON AND LOCALITY

Upper Beekmantown from Point Lévis and Lot

21, Range 6, Division D, Stanbridge, P.Q. The holotype is in the Museum of the Geological Survey of Canada. Paratype No. 1748 in the Museum of Comp. Zoölogy.

FAMILY ENCRINURIDAE ANGELIN

Cybele Kutorga*Cybele? pervetusta* sp. nov.

Plate 1, fig. 4.

Known from a single pygidium.

In the absence of associated cranidia of *Encrinurus*, *Cybele*, or *Cybeloides*, the pygidium in question can only be provisionally referred to *Cybele*. Axial lobe an elongate spherical triangle lacking annulation. In place of rings, five pairs of pit-like depressions occur on the anterior part. These represent either vestigial or rudimentary furrows. Pleural lobes apparently with five ribs which turn back sharply, parallel to the axial lobe. The pair of ribs nearest axial lobe meet posteriorly.

This pygidium is quite unlike any of the related forms in its large size and smooth axial and lateral lobes.

MEASUREMENTS

Length	Width	Length of Axial Lobe	Width of Axial Lobe
13 mm.	15 mm.	11 mm.	5 mm.

HORIZON AND LOCALITY

Middle Beekmantown from Division B5 at St. Armand, P.Q. Collected by A. Hyatt, and No. 1749 in the M. C. Z.

FAMILY CHEIRURIDAE SALTER

SUBFAMILY CHEIRURINAE RAYMOND

Strotactinus genus novum.

Plate 1, figs. 1, 2.

Amphion salteri Billings, *Canadian Nat. Geol.*, 1861, p. 322, fig. 6.; *Geol. Canada, Geol. Surv. Canada*, 1863, p. 278, fig. 248a, b.; *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 352, fig. 339.

cf. *Ceraurinus* Barton, *Bull. Mus. Comp. Zool.*, 54, 1913, p. 547.

cf. *Pliomerops* Raymond, *Amer. Jour. Sci.*, 4th ser., 19, 1905, p. 378; *Zittel-Eastman Textb. Pal.*, 1913, p. 725.

The most common trilobite in the Beekmantown limestone at Philipsburg, exclusive of the ubiquitous *Lloydia saffordi*, is the *Amphion salteri* of Billings. Although free cheeks and thorax are unknown, cranidia and pygidia of this type are constantly associated on the same slab of rock. No other similar form is sufficiently common to establish any doubt that the parts under discussion belong to the same species. The cranidium resembles in general that of *Ceraurinus marginatus* Barton, with certain important differences. The pygidium resembles in general that of *Pliomerops canadensis* Raymond. For trilobites of this type the writer proposes the name *Strotactinus*.

DESCRIPTION

In the only specimen at the writer's command which shows a complete fixed cheek, the width of the cephalon at the neck furrow measures 12mm., while the length is 6 mm. In other specimens studied, the width appears less in comparison with the length. This ratio was given by Billings as 3:5 in his original description of the type, and the present writer is inclined to accept this as the probable ratio for the average specimen. The importance of this ratio is seen in a comparison with the cranidia of *Ceraurinus*, in which the width is typically more than twice the length. This narrower and longer appearance of the cranidium of *Strotactinus* is due to the fact that in this genus the intramarginal furrow at the anterior margin of the fixed cheek meets the glabella at or a trifle below the point of origin of the first glabellar furrow. In *Ceraurinus*, the intramarginal furrow always meets the glabella anterior to the first glabellar furrow. The glabella, therefore, appears to sit higher with reference to the cheeks in *Strotactinus* than in *Ceraurinus*.

Glabella weakly convex, subrectangular, straight-sided, never expanding anteriorly as in *Ceraurinus ornatus* and *C. trentonensis*. Three pairs of glabellar furrows gently curving backwards. Neck furrows straight, lacking forward flexure on the axial region of the glabella. Eye apparently long, narrow, opposite second lobe of glabella anterior to neck furrow. Fixed cheek pustulose as in *Ceraurinus*.

Pygidium resembles that of *Pliomerops canadensis* in having five or six segments on the conical axial lobe and five ribs on each of the lateral lobes. Axial lobe in *Strotactinus* relatively smaller than that of *Pliomerops*. Average size of *Strotactinus* considerably less than that of *Pliomerops* so that typical pygidia of the latter show wider furrows between the ribs and a greater general convexity of parts.

CLASSIFICATION

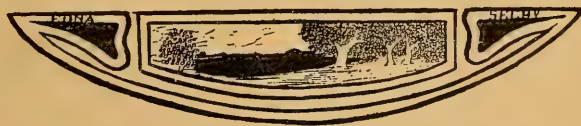
Strotactinus appears to be a transition genus from trilobites with pygidia containing five segments to those with pygidia of four segments and a tendency to develop highly the first pair of spines. The pygidium is very similar to that of *Pliomerinae*. The head, on the other hand, is clearly that of the *Cheirurinae*, and entitles *Strotactinus* to be classed with that sub-family. The glabella of the *Pliomerinae* shows a deviation from the normal, whereas the pygidium lacks any particular specialization. Since the most striking characteristic of the *Pliomerinae* is this specialized glabella, *Strotactinus*, whose glabella is not specialized, must be included in the *Cheirurinae*. On the other hand, since *Strotactinus* has a pygidium much like the *Pliomerinae* and very likely much like the ancestors of the entire family, it must be classed as a primitive genus of the *Cheirurinae*. The tendency in the *Cheiruridae* was to reduce the pygidial segments until the pygidium was very small, with the first pair of spines very long, the others short or absent as in *Ceraurus*. *Cheirurus* is intermediate between *Strotactinus* and *Ceraurus*.

HORIZON AND LOCALITY

Middle and Upper Beekmantown, Philipsburg and Stanbridge, P.Q. Figured specimens Nos. 1750 and 1751 in the Museum of Comp. Zoölogy.

EXPLANATION OF PLATE

- FIGS. 1, 2—*Strotactinus salteri* (Billings). X2.
 3—*Petigurus subrectus* Bradley. X1.
 4—*Cybele? perversa* Bradley. The faint depressions on the axial lobe are not shown on the figure. X1.
 5—*Leioptegium quadratum* (Billings.) X1.
 6—*Lloydia obscura* Bradley. X2.
 7—*Bathyporeus flabellus* Bradley. X2.
 8—*Lloydia amplimarginata* Bradley. X2.
 9, 10—*Lloydia saffordi* (Billings). A small pygidium and an hypostoma. X1.
 11—*Lloydia pinguis* Bradley. X2.



SOME NOTES ON "RESIDENT" BIRD-BANDING ON VANCOUVER ISLAND, BRITISH COLUMBIA

By G. D. SPROT



THE SMALL acreage owned by me—some nine acres in all—is situated on the western shores of Saanich Inlet in an open bay, known locally as Mill Bay, but, correctly, as Creek Bay. The land slopes fairly steeply down to the shore and is covered by a dense growth of fifteen-year-old Douglas Fir, Hemlock, Balsam, and Cedar, with a sprinkling of Arbutus, Maple, Dogwood, Alder, and Willow. The aspect is north-east and the Peninsula, about five miles across the Inlet, lies low, giving little shelter from the prevailing winds of north to south-east.

I feel safe in saying that the south-east coast of the Island, at least that portion from Victoria to Nanaimo, is well out of the lines of flight of most land birds of passage, other than those wintering or nesting upon the Island. It will, therefore, be easily understood that, except among the Anatidæ, little in the way of extensive migrant banding can be carried on in this area. Consequently, I have given most of my spare time to a closer study of the resident species throughout the year, a branch of banding that at present seems rather neglected by many, in favour of spring migrant trapping and of nestling banding during summer. It has been mentioned both in America and in Europe that there is little satisfaction to be got out of the banding of "residents", for the movements of such are too easily controlled by regular feeding. Undoubtedly this may be the case, but are its movements the only points of interest that we desire to trace in the life history of a bird? I find the interest in "resident" banding never dulls. With a careful system of keeping notes on the plumage, growth, movements, etc., of each species, many interesting as well as surprising facts are revealed, which one could never discover through field-glass observation or the study of skins alone. To me there is no more fascinating hobby than that of "resident" banding throughout the year, but to get the most out of it, one must be prepared to stay with it. This, of course, is possible only with those who have a permanent home. It matters little whether one lives at home all day or only returns home to sleep and eat, so to speak. An hour or two a day or twice a week for trapping, as long as the birds are fed daily, is all that is required to get results. In fact, I find better results are obtained in this way than if one stands at the end of a pull string all day and every day. Migrants who remain but a week or two around the traps will stand a lot of bullying and may be

caught three or four times a day during their stay, but with residents it does not pay to pull constantly over them, and for this reason it is better to feed every day under the open detachable funnel trap, as described by me at an earlier date in *The Canadian Field-Naturalist*, and merely replace the funnel for an hour or two when the time can be spared.

One of the most interesting movements among "residents" that I have learned through banding is their late winter or early spring wanderings. I had previously suspected a somewhat sluggish northerly movement in early spring along this coast among such species as Juncos, Robins, Bluebirds, Meadowlarks and Red-winged Blackbirds, and when a large flock of Juncos, unbanded, suddenly arrived at the latter end of January, 1924, I thought for some time that the northerly migration had started. This idea was strengthened by the sudden absence of "repeats" from those birds banded in November, December and early January, causing me to imagine that they had moved on northwards. Again was it strengthened still further by the appearance of Robins and Bluebirds, and, on February 19th, of Red-winged Blackbirds. Bluebirds remain all winter as far north as the 49th parallel but on our west coast only. Robins seldom remain north of 48°31', except during such mild winters as that just past, when single individuals are sometimes to be found as far north as Cowichan. However, the whole idea of a probable northerly movement "crashed" when the late January flock of new arrivals, after being for the most part banded, suddenly disappeared and the December banded birds as suddenly reappeared. Another "theory" I had in reserve to account for such irregular arrivals and departures of some species usually termed "migrants" on this Island, but of which many individuals remain all winter, was then tried out and was greatly strengthened by the downfall of my former idea. This was that many birds commonly recorded in spring as "early arrivals of migrants" are really only "wandering winter residents" on the search for food, and because at this season it is usual for the food supply to be suddenly cut off through warm wet weather causing wild seeds to germinate, etc., these wanderers are found and noted far to the north of their winter homes and consequently get recorded as "first arrivals in the general northerly migration" when actually they have, as yet, no intention of seeking nesting sites for some time to come. In connection with the

above remarks on "wandering winter residents" it appears that when a large flock of some species arrives in a particular locality already frequented by another flock of the same species, as was the case with the Juncos, the stronger unit often ejects the weaker to the outskirts and when, as is the case in steady trapping, the stronger have been mostly caught and banded, they become "stale" and desert the station for a short time, allowing the weaker to close in again upon the traps. In the case of the Californian Partridges or Quail, as they are called locally, one covey only was present from November, 1923, and fed continually at Position A. In January, 1924, a stronger unit arrived and for some time the November birds disappeared, re-appearing however, a few weeks later, having discovered my other feeding station and trap at Position B. (See under Californian Partridges.)

As each bird is caught it is carefully handled and examined and, at certain times of the year, I found such birds as Jays and Juncos extremely lousy and consequently ill-conditioned, but, after feeding for several days in and around the traps they appeared stronger, weighing heavier, and in this condition seemed to be able to shake off these pests. Ticks were also found on these two species and in every case noted these were found in the angles of the eyes on the lids, four or five in a cluster, like small black beads, though never much larger than a small pin head. In one case, however, a well-grown tick was found hanging to the upper eyelid of a Junco, but with too secure a hold to be removed. I thought of applying a hot needle, thereby causing it to back out, but was afraid of the heat injuring the bird's sight and therefore was unable to forward the tick in a whole condition to headquarters to be identified. Curiously enough, I never re-caught, to my knowledge, any birds so afflicted, so was unable to note the effect of this pest on its host or study its growth. Question: Is it possible that these pests in the early pin-head stage had proved fatal to their hosts?

A few notes here on the species proving the most interesting might not come amiss. These were Californian Partridges, Steller's Jays, Juncos and Towhees. A good many other species were handled, but not in sufficient numbers to become really interesting material.

CALIFORNIAN PARTRIDGES (OR, LOCALLY, QUAIL).

My work with this species has been somewhat disappointing, owing to a shortage of bands, but some notes of interest were made.

A fresh covey of these birds arrived in January, 1924, numbering from 16 to 20, and several were banded. They remained in the vicinity of the

trap (Position A.) Those birds banded in November had been present in the vicinity of Position A every day up to this date. They, however, left it on the arrival of the stronger unit (the November birds, at the close of the shooting season, numbering only from 8 to 9). A week or so after this, however, the November birds re-appeared at Position B on the opposite side of the dwelling house, where they remained. An interesting fact in connection with the above is that neither covey ever associated with the other nor did they, to my knowledge, ever poach on each other's preserves.

The road leading from my house to the main road seemed the boundary line between the two positions. On either side of this road are thick groups of young firs and in these trees both coveys roosted but each covey on its own side of the road. I was constantly putting the birds up and it was fairly easy to recognize them, owing to their numbers, but I do not remember on any single occasion putting up the larger covey on Position B side of the road nor the smaller on Position A side from early January to the last week in February, when the bands arrived but the birds had scattered. The manner of roosting of these birds was easily observed, as the trees are only some 15 or 20 yards from the front of my house. These birds had been allowed to feed under the traps without being molested in any way during this time so it is natural that they would stick to these separate feeding grounds. Under such conditions we cannot therefore say that the above notes show what Quail may do under other or more natural conditions, but they may at least prove a guide to future observations along this line.

An experiment to the results of which I do not attach much importance was a speed test with these birds. I could catch very few birds just at the time I wanted them, but tried 7 birds over a 55-yard course, using a stop watch giving 1-5 secs. The results gave an average with two birds of 25 miles an hour, but they glided perhaps 1-3 of the course. To test the rate of gliding, one bird was thrown lightly forward, it glided the entire course from this send off, crossing at the rate of $22\frac{1}{2}$ miles per hour. Owing to having little cleared land, the distance was too short; it should be about 110 yards, I should say, for a fair trial with this species, but the course must be measured accurately (aerial measure) and a stop watch giving 1-5 secs. is essential. Birds should be headed in the direction of their daily "stamping grounds" or they will swerve or break back, and the finishing line must be well back from the bushes or any other likely landing or the birds will apply the brakes before crossing the line. Four out of my seven birds were disqualified for

swerving or checking the flight or breaking back before I discovered and corrected my mistakes.

STELLER'S JAY

This species proved the most interesting, repeating steadily. It was always easy to tell an unbanded bird from a repeat when in the trap as the unbanded birds kept springing up and down until, when finally driven into the collecting box, they would reel and fall upon their sides. A "repeat" seldom, if ever, did this, but merely ran back and forth in the trap. I found these birds the quietest of all to handle and the most interesting to study. Two out of some twenty banded last winter nested close by. I fancy both were males. The young of the two families were also banded. Their domestic affairs proved interesting, but would make too long a story here, as would also the notes on the variation in plumage of this species. All Jays deserted the traps during December, 1923, for the depths of the woods, a cedar grove about a mile away, but after this very wet month was over and drier but colder weather took the place of the heavy rains, they returned, remaining until March 1st, when, with other birds, the majority moved off.

OREGON TOWHEE

Towhees proved to be great "scrappers" and never failed to bite, squeal, and in some cases, even before being touched, lie upon their backs like a Hawk and squeal with rage. They were

also quick to find an opening and would slip through the smallest hole in quick time if given the chance. They were hardly shy but extremely cunning, visiting the traps just at daybreak or at night when it was almost too dark for me to see them at thirty yards distance. When nesting, the males were hard to catch but the females would repeat fairly regularly. The young birds are easily caught and repeat freely and the change of plumage and eye-colour makes an interesting study in birds so easily taken.

OREGON JUNCOS

Although these birds were plentiful in autumn it was not until January, 1924, that they came to the traps in any numbers, but from then on until March 1st ninety-eight were banded. In this species the difference in plumage of the several flocks was also especially noted, as was also the fact that these different flocks seldom associated until the last week before leaving for the nesting sites.

Contrary to the experiences of most banders, I find the summer months, commencing about June 1st, to be the best time of year for trapping seed eaters, although February by a very small margin was actually my best month. I have used whole wheat and cracked corn only, through the summer months, as proving the most attractive bait to the birds in my area.

AN EXPLORATION INTO THE NORTHERN PLAINS NORTH AND EAST OF GREAT SLAVE LAKE, INCLUDING THE SOURCE OF THE COPPERMINE RIVER

By G. H. BLANCHET, F.R.G.S.
of the Topographical Survey of Canada

(Continued from page 187, Vol. XXXVIII, December, 1924)

THE INTERIOR WATERWAYS.

Pike's Portage route brings you to Artillery Lake, the start of a connected series of large lakes. These waterways occupy a strategic position in giving access to a stretch of country appealing to the imagination in its vastness and from the mists of obscurity that veil much of it. The three great rivers of the north, Coppermine, Back's and Thelon, with over a thousand miles of intercepted seacoast, may be reached by short portages over the height of land, and by them bases may be established at advanced points from which the great unknown country off the waterways may be explored.

The lake series comprises five large lakes, connected by narrows or rivers, remarkable from the fact that in their total length of three hundred

miles there are only two stretches where navigation is interrupted and also, in that, by their situation, lying in a great arc, they nearly close a circle with Great Slave Lake. By them, one leaves the rough country of the border of the plateau, passes beyond the forests far into the northern plains, then, swinging to the southwest, returns to the woods.

In travelling these waters one can observe thoroughly the conditions existing at the edge of the forests and one phase of the so-called Barren Lands—the country of the height of land. One finds himself constantly correcting early impressions and forced to disconnect accidental conditions of living from actual conditions of the country itself. The following remarks on the waterways and the country including them are

based on observations made in the course of a survey and exploration during the past season (1924).

Proceeding up Artillery Lake we soon passed the edge of the straggling forests and entered "Barren Land" conditions. Should the traveller be anticipating an increasing ruggedness and bleakness, as the name suggests, he would find himself much mistaken, for the rough topography, associated with the bordering zone of the plateau, gradually subsides to long low hills and wide, flat valleys, rock exposures become increasingly rare, and the boulders which, in the rocky border of the plateau, lies cattered in every direction, completely exposed and in the situation in which the ice deposited them, become more and more imbedded in the drift. The trees disappear, it is true, but a healthy growth of shrubbery, moss and grass replaces them. One passes from rocky broken hills with scattered and stunted trees to open rolling plains covered with a fairly abundant vegetation, though of a restricted type.

Artillery Lake occupies a well defined valley and is of simple shape, consequently it has been fairly accurately mapped from the earliest times and it offers little difficulty for travel. Some 20 miles up the lake on the south side a lofty dolomite hill, with a sheer water face, and a high isolated drift hill at the end of a long low point across the lake have been connected with the supernatural by Indian legend. The former is known as the Beaver Lodge and the latter as the Rat Lodge, and the natives still dread the place, believing that the spirits of the dead monsters still control the winds and waves here and must be propitiated by the gift of some article of value to the lake. Near the north end of the lake a sandy plain of considerable width stretches across the country in an east and west direction, by which, according to Indian reports, one may travel westerly to Fort Rae on Great Slave Lake and to the east to Thelon River. There is a slight revival of the forests in this sandy country in clumps of very stunted spruce.

On leaving Artillery Lake, a stretch of 12 miles of lake-like expansions, connected by narrows with swift water or rapids, brings you to Casba, or Ptarmigan Lake. Disconnected areas of sand, wind-blown into hills and buttes, are features of this part of the country. Casba Lake lies in a shallow depression spreading to deep bays to the southwest and southeast. The latter approaches very nearly to waters draining, by Hanbury and Thelon Rivers, to Hudson Bay; in fact, at two points low morainic ridges have been accidents of topography diverting the waters of the upper lakes to Great Slave Lake and the Arctic instead of to Hudson Bay. A bold range of hills, largely ex-

posed granite, closes the north end of the lake, with a narrow channel passing around its east end, giving access to Clinton-Colden Lake.

To this point the lakes have been fairly free from islands and of regular shape, and, with Back's map, corrected by Tyrrell's survey of 1900, there has been comparatively little difficulty in travel. Tyrrell's course left this route for Hanbury and Thelon Rivers from the south-east bay of Clinton-Colden Lake, and Back's track from here furnishes only the roughest sketches of the lakes. Moreover, the topography of the country in which Clinton-Colden and Aylmer Lakes lie is entirely lacking in continuity; the hills are irregular, both in disposition and in extent, and the intervening water-filled valleys, which unite to form the lakes, present a bewildering succession of bays and channels and islands and headlands with little to distinguish one from the other. Little may be taken from Back's map except the approximate distance and direction from one another of the three points at which his track touched known mainland, the entrance to Clinton-Colden Lake, the narrows of Tha-na-koei joining it to Aylmer Lake, and the northern extremity of this lake, from which the portage is made to Back's River. Stewart and Anderson, in 1855, travelling from Great Slave Lake to the coast, searching for the lost Franklin expedition, entered Aylmer Lake from the west by a portage route from Great Slave Lake to Outram River and by it to Aylmer Lake. Their record did little more than establish the existence of Outram River.

About these points, fixed in position with some accuracy, the map of Aylmer and Clinton-Colden Lakes was built up. It was bound to be inaccurate on account of the difficult topography, and also from Back's tendency to overestimate distances not checked by observation. Actually the map of the lakes was almost useless for travel, and it was necessary to resort to the expedient of examining each bay for the outlet.

In proceeding northwesterly the country changes from an undulating plain to one of a more rolling character, which may be compared to the condition of the waves of the sea after a storm—short and rounded hills stretching in an endless succession to the horizon. One's view from a hill top is usually of several repetitions of the hill he is on, with the bays of the lake continued in the valleys in disconnected small lakes. The impression of vastness, which the constant repetition of a familiar type produces, is at times almost overpowering as the mind carries on beyond the visible horizon with nothing to fix a limit to its range.

After leaving Aylmer Lake, we had not proceeded far up Outram River when we passed the point at which Stewart and Anderson had entered it.

Ahead lay a country mapped largely by tradition. The Indians with Back had given him a sketch of a large lake to the west. Its existence was proved fifty years later, when Warburton Pike, in the course of a private expedition from Great Slave Lake to the musk-ox country, crossed this lake, which he named Lake MacKay. He also made a sketch map of the country to the north, including the headwaters of Coppermine River, until then unknown. Although these features were accepted and shown on the maps, they were unsupported by observation. Moreover, it did not appear reasonable that Coppermine River could rise close to the Arctic, as it has been shown, and the form given to the lakes, great open bodies of water, is hardly to be expected in the country of the height of land. It was, therefore, with keen interest that these unknown waters were entered and each new view included possible discoveries. The Indians had reported that there were no rapids between Aylmer Lake and Lake MacKay, and also that no canoe route existed by which the Coppermine could be reached. We had scarcely left the last recognizable point of Stewart and Anderson when we opened up a view of a heavy rapid. Above it the parallel lines of high, rocky hills, with a well defined valley between them, suggested a large lake, and the waters entered on approaching them justified this expectation. It was assumed that this was Lake MacKay and that consequently Outram River was comparatively short. Acting on this assumption, it was decided to attempt to reach the Coppermine from this point, striking out in a northwesterly direction as far as possible. A short exploration to the north showed the country to be well supplied with small lakes for some distance, while the northern horizon was closed by a blue range of hills, broken at one point by a decided notch. Outfit was cut down to a small canoe, a silk tent and pole, a rifle and ammunition, tea, sugar, and salt and several roasting sticks. We were prepared to make long portages and to live off the country.

We travelled more by the hills than by the country immediately before us, and usually had a problematic range closing our horizon. Later on, after reaching the Coppermine, we found ourselves repeatedly blocked to the north by a persistent range of hills that forms the northern boundary of its watershed, but in the earlier part of the trip we were fortunate in finding a good water route. In fact, as we afterwards found, we had by chance hit the only route practicable for summer travel with an outfit. However, this was not at once apparent. Again and again the hills appeared to close off the north and west, but each time a break would open up by which we passed from the headwaters of one stream to that of another. The

streams were small but the lakes in which they took their rise were numerous and of fair size. Our first chain of lakes brought us to the notch in the hills; these drain to Outram River. A short portage led to some irregular water draining easterly to Aylmer Lake, and another divide, crossed by a chain of small lakes, opened into a large lake of very irregular form with high rocky country to the south, while to the north were sandy areas, hills and ridges. This was assumed to be the Lac de Gras of the map. The various features appeared to be represented—to the east it was joined, by some rapids, which we could hear but did not investigate, to another lake supposed to be Lac du Savage, and the east bay opened out to an expansion with a large northerly bay and with a further extension to the west. To establish the identity of the lake we set out confidently to its southwest corner where the Coppermine should flow out. After several days of disappointing searching, when each bay closed or received a small stream, we were forced to the conclusion, later verified, that the rapids noted at the east end carried the water out of instead of into the lake, and that the lake was one of which no record existed. From its situation it appears most reasonable that this is the main headwaters of Back's River, and that it joins the Sussex Lake branch by Icy River.

We had observed a lake or a series of lakes to the westward from a high hill, and now proceeded to investigate it. A portage of eight miles, using some small lakes, brought us to the easterly extremity of these new waters, and it was again necessary to work our way westward by the southerly shore. After clearing some complicated bays we opened up an extensive view to the westward with a water horizon. As we proceeded a slow swing of the coast kept revealing new distant views with the lake stretching beyond the horizon. Finally, as we approached the west end, the high rugged country which composed it closed in with no apparent break, and it was only when examining the last possible bay that the distant roar of heavy water led us to an unexpected break in the hills, of a gorge-like nature, through which a heavy discharge of water broke in a series of rapids.

In addition to this being the successful conclusion of a long and difficult trip, featured by many disappointments, the scene was one of considerable natural charm. The great open stretch of the lake discharged tumultuously through the barrier ridge into a pleasant open valley, with the harshness of the enclosing hills softened by the blue haze of distance. Winding through the valley flowed the Coppermine, inseparably connected with the story of the exploration of the

North. Animation was given to the scene by the constant and rather aimless travel of band after band of caribou, crossing and recrossing the river, feeding in the valley, and disappearing over the hills. Perhaps the view afforded unusual gratification in being the one considerable feature of the Coppermine—its discharge from its headwaters lake—that had never before been viewed by a white man. We built a cairn on a commanding rocky hill and left a record in it. There is a gap of perhaps thirty miles between this point and Franklin's farthest upstream exploration of the Coppermine at Lake Providence. Time did not permit of an investigation of this stretch, as we proposed on the return to attempt to work our way to the north or northeast into the musk-ox country.

Returning by the north shore, each stream and connected water was examined, to complete the exploration of the Coppermine headwaters and in order to find a route to the north if such existed. All the features of the map of this coast, the north bay, Lake Paul, Lac du Savage and the stream flowing into it (considered to be the Upper Coppermine), proved to have been much exaggerated, and a high rough range enclosing the lake on the north precluded the possibility of a water route in this direction. A return was therefore made to Outram River and the exploration continued westward to Lake MacKay.

We had not proceeded far from the point from which the Coppermine route branches off when the hills closed in, and we were confronted by a formidable cascade with over fifty feet of a fall, which disproved our assumed Lake MacKay. Above the cascade the hills fell away on either side, and the country has the appearance of a series of shallow ridges. Through this plain the river meanders, here deflected by the ridges and elsewhere enclosed by them to form shallow lakes of irregular shape with rapids where they discharge. The trip upstream was tedious, with the succession of riffles and rapids, up which the canoe had to be hauled or poled, and the lack of any commanding hills made it impossible to judge the country ahead.

Finally, after skirting the border of some high rocky country, we ascended by a heavy boulder rapid and the river opened out into a broad expanse with a water horizon, which proved to be Lake MacKay. We had climbed nearly 200 feet above Aylmer Lake. To the north Lac de Gras lay 100 feet below this level, while to the south and west Great Slave Lake was at 900 feet lower elevation. No hills of any prominence were within range of us, though we later found the southwest end of the lake enclosed by rugged country somewhat similar to that at the south end of Artillery Lake. MacKay Lake apparently occupies a flat tableland at the extreme summit level of this part of the country, with nothing



FIGURE 4.—COPPERMINE RIVER NEAR THE POINT OF DISCHARGE
FROM LAC DE GRAS

The series of rapids here are favorite crossing places for the caribou. They think nothing of entering the roughest water.



FIGURE 5.—THE TRIP TO LAC DE GRAS,
the headwaters of Coppermine River, included over 50 miles of small lakes
and the intervening portages.

constraining it to discharge in any particular direction, so that it spilled in an uncertain manner across the low morainic plain already described.

The exploration of Lake MacKay revealed it to be considerably misplaced on the map, on which its size has been greatly exaggerated. It lies parallel to Artillery Lake, and is similar in character to it in the nature of the lake itself and of the country in which it lies. In the rugged country

of its south end the edge of the forest is again reached. As all the country travelled between the last woods of Artillery Lake and this point was destitute of trees, where fuel was limited to small willows and a certain variety of moss, it may be appreciated how great a pleasure it was to see the trees again and to have the benefit of their shelter and the comfort of a cheerful fire.

(Continued in the February issue)

THE BIRDS OF OTTAWA—ADDENDA TO OCTOBER 2, 1924

By HOYES LLOYD

SINCE the publication of *The Birds of Ottawa, 1923*, which paper was revised to March 20, 1923, a number of items relating to the birds of the district have come to my attention in various ways. These addenda to the 1923 list do not include reference to articles published since that list which deal with the birds of the district, because those interested may consult these articles in recent numbers of our publication.

1. *Moris bassana*. GANNET.—On November 21, 1923, Mr. C. H. Young saw, flying over the city, a Gannet which, to judge from its dull gray

colour, was a juvenile. He is thoroughly familiar with the bird in life. Some time in the fall of 1923 Messrs. N. H. H. Lett and J. A. Armstrong reported a strange bird to G. R. White and me. They described it as being of the size of a Goose, and stated that it had been observed near Cummings Island in the Rideau River. The descriptions did not identify it, but it is quite possible that it was this Gannet or another. It is significant that about a week after this account of the strange bird in the Rideau was heard, Mr. E. G. White was informed that a Gannet had been shot at Rideau Lake, Ontario.

2. *Phælotomus pileatus abieticola*. NORTHERN PILEATED WOODPECKER.—Perhaps as the result of

1. C. F. N. XXXVII, 1923, pp. 101-105, 125-127, 151-156, XXXVIII, 1924, pp. 10-16.

better protection, this striking bird of the forests is again being found near the city. I located one a few miles back of Hull, Quebec, on November 12, 1923, and Mr. D. Blakely found one at the Rifle Ranges, Rockcliffe, on October 2, 1924.

3. *Melanerpes erythrocephalus*. RED-HEADED WOODPECKER.—I am indebted to Miss Edith Morrow, of Montreal, for a definite breeding date of this species. From her account it appears that one was feeding young in the nest at Rockcliffe in June, 1920.

4. *Sturnus vulgaris*. STARLING.—Mr. Rodney C. Wood believes that he saw one alight on the fence of the railway near South Indian, Russell County, Ontario, while he was travelling by train, January 3, 1924. At the time there was snow on the ground and a heavy snow storm was raging. Two days later, January 5th, Philip Foran and I saw two Starlings flying eastward, down the Ottawa, when we were snow-shoeing near the Rifle Ranges, just below Rockcliffe. Each fall for some years there has been a roost of Grackles, Red-winged Blackbirds, and Cowbirds near the village of Britannia, although this year it seems to be across the Deschenes Rapids in Quebec. On several occasions late in August, 1924, I watched the birds flying to the roost, and while suspicious of the identity of some small groups among the masses, did not definitely suspect that these were Starlings until August 30th. Determining to solve the question for certain, I set out for Britannia on the evening of September 5th. The sun was setting when the first important companies began to arrive, circle hesitatingly about the old-time roost, swing low over the field near the river, and then cross the Ottawa. A quarter of a mile away a flock of a thousand birds, more or less, gathered in some corn. From this assembly about five hundred birds, all alike, broke away and passed to the roost. I thought them Cowbirds, but the light was poor, and they flew close to the ground. Another flock passed, and when the third came near me a shot brought down three Starlings. Probably this last flock of two hundred birds consisted entirely of Starlings, and it is quite possible that the entire group from the corn were Starlings. Presumably the Starling then has a

strong hold in this vicinity already, although it is just over two years since the first example was noticed. Incidentally, it is thought that these are the first specimens of the species to be taken at Ottawa.

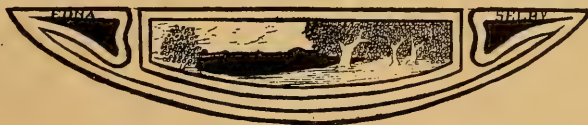
E. G. White tells me that there were at least one hundred Starlings at the duck marsh, Lochaber, Quebec, on September 20th.

5. *Spizella pusilla pusilla*. FIELD SPARROW.—While the recorded occurrences of the species in our district in summer offer presumptive evidence of its breeding, it was not till the past summer that more definite testimony was secured, so far as the records show. On September 1, 1924 I collected a juvenile Field Sparrow at Constance Lake, Ontario, 14 miles west of the city. Both the plumage and the action of the bird make me think that it was taken at the place where the nesting occurred, although the bird could fly, and perhaps this last assumption is not absolutely warranted by the facts.

6. *Pipilo erythrophthalmus erythrophthalmus*. TOWHEE.—On May 10, 1918, Mr. J. Philip Bill, with his wife, and Dr. E. Gordon Bill, saw a female Towhee near his residence, at that time 90 James Street, Ottawa. Dr. Bill was familiar with the species from observations made elsewhere.

7. *Dendroica coronata*. MYRTLE WARBLER.—In the course of a Christmas bird census walk, on December 22, 1923, Mr. Harrison F. Lewis found a Myrtle Warbler in a grove of red pines near Wychwood, some seven miles west of Hull, Quebec. The bird was in the company of a flock of Chickadees. Identification is based upon careful observation with X6 binoculars, and the characteristic *chip* note was heard. This is the first occurrence of the species in the Ottawa district in winter.

8. *Dendroica vigosii*. PINE WARBLER.—At an excursion to Fairy Lake, near Hull, Quebec, on May 19, 1923, this species was found in song, and on July 15th of that year a specimen was taken. This tends to confirm the belief that the Pine Warbler is a rare summer resident. I found the species again in the same general locality on May 18, 1924, and on the 21st Mr. P. A. Taverner secured a specimen there for the National Museum.



OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS**(Continued from page 191, Vol. XXXVIII, December, 1924)*

MALLARD, No. 205,656, female, banded by L. V. Walton, at Cuivre Island, Missouri, on March 9, 1923, was shot at a place forty miles north-east of Winnipeg, Manitoba, on September 15, 1923.

MALLARD, No. 205,678, female, banded by L. V. Walton, at Cuivre Island, Missouri, on March 9, 1923, was shot at Smooth Stone Lake, Saskatchewan, Tp. 65, R. 6, W. 3rd M., during the spring of 1923.

MALLARD, No. 205,703, banded by Jos. Pulitzer, at Cuivre Island, Missouri, on March 10, 1923, was shot at Kelliher, Saskatchewan, on November 1, 1923.

MALLARD, No. 102,183, banded by Allen Green, at Oakville, Iowa, on March 18, 1923, was shot near Moline, Manitoba, on November 6, 1923.

MALLARD, No. 205,802, female, banded by Jos. Pulitzer, at Cuivre Island, Missouri, on March 19, 1923, was killed at Lampman, Saskatchewan, on November 4, 1923.

MALLARD, No. 203,642, male, banded by John Broeker, at Portage des Sioux, Missouri, on March 21, 1923, was taken in a muskrat trap, at Kirby, Saskatchewan, N.W. $\frac{1}{4}$ of Sec. 28, Tp. 39, Rge. 15, W. of 2nd M., on April 28, 1924.

MALLARD, No. 205,890, banded by L. V. Walton, at Cuivre Island, Missouri, on March 22, 1923, was shot at Long Lake, Alberta, on May 6, 1923.

MALLARD, No. 203,659, female, banded by John Broeker, at Portage des Sioux, Missouri, on March 23, 1923, was killed at a place about two hundred miles north of The Pas, Manitoba, on the Churchill River, on May 5, 1923.

MALLARD, No. 205,921, banded by L. V. Walton, at Cuivre Island, Missouri, on March 23, 1923, was shot at Indian Head, Saskatchewan, shortly before November 8, 1923.

MALLARD, No. 203,683, banded by John Broeker, at Portage des Sioux, Missouri, on March 24, 1923, was killed at Fish River, Saskatchewan, on May 16, 1923.

MALLARD, No. 203,733, banded by Jos. Pulitzer, at Portage des Sioux, Missouri, on March 30, 1923, was shot at Chauvin, Alberta, on October 25, 1923.

BLACK DUCK, No. 200,284, banded by L. V. Walton, at Cuivre Island, Missouri, on January 10, 1923, was killed in the vicinity of Ogoki Post of Hudson's Bay Company which is on Ogoki River, a tributary of the Albany River, on May 4, 1923.

BLACK DUCK, No. 101,811, banded by A. A. Allen, at Ithaca, New York, on January 19, 1923, was taken at a place sixteen miles east of Parry Sound, Georgian Bay, Ontario, on April 28, 1923.

BLACK DUCK, No. 203,310, banded by Jos. Pulitzer, at Portage des Sioux, Missouri, on January 22, 1923, was shot near the mouth of the Michipicoten River, one hundred and twenty miles north of Sault Ste. Marie, Ontario, on May 3, 1923.

BLACK DUCK, No. 101,841, banded by D. Beyea, at Union Springs, New York, on February 1, 1923, was shot at Mud Lake, twenty-five miles north-west of Kingston, Ontario, on October 5, 1923.

BLACK DUCK, No. 204,220, banded by Douglas H. Beyea, at Union Springs, New York, on March 9, 1923, was killed in a mink trap at South River, Ontario, on April 15, 1924.

BLUE-WINGED TEAL, No. 232,575, banded by John Broeker, at Portage des Sioux, Missouri, on April 18, 1923, was killed at Partridge Crop Lake, Saskatchewan, on May 22, 1923.

BLUE-WINGED TEAL, No. 232,632, banded by John Broeker, at Portage des Sioux, Missouri, on April 26, 1923, was shot at Niverville, Manitoba, twenty miles south of Winnipeg, about October 1, 1923.

BLUE-WINGED TEAL, No. 210,958, adult, male, banded by Herman Battersby, at Oak Lake, Manitoba, on May 29, 1923, was shot on a river four miles south of Adams, Kansas, on November 10, 1923.

BLUE-WINGED TEAL, No. 232,315, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on July 21, 1923, was re-caught in the same trap on July 29, 1923, and was shot at Ellingson, South Dakota, on October 9, 1923.

PINTAIL, No. 101,853, female, banded by L. V. Walton, at Cuivre Island, Missouri, on January 14, 1923, was killed at Churchill Post of the Hudson's Bay Company, Manitoba, on July 15, 1923.

CANVAS-BACK DUCK, No. 211,119, fledgeling, banded by Adolf L. Holm, at Otto, Manitoba, on July 20, 1923, was shot at Canterbury, Manitoba, at the south-east end of Lake Winnipeg, on October 18, 1923.

GREATER SCAUP DUCK, No. 204,277, banded by A. A. Allen, at Cayuga Lake, New York, on March 6, 1923, was killed on the St. Lawrence River, twenty-five miles above Ogdensburg, in Canadian waters, during the month of April, 1924.

GREATER SCAUP DUCK, No. 204,248, banded by D. H. Beyea, at Union Springs, New York, on March 15, 1923, was shot in the Province of Ontario, near the Quebec boundary, on the St. Lawrence River, on September 29, 1923.

CANADA GOOSE, No. 232,045, banded by Reuben Lloyd, at Last Mountain Lake, Saskatchewan, on July 30, 1923, was killed in the same vicinity—no date given, but reported on October 30, 1923.

CANADA GOOSE, No. 232,085, raised in captivity by Reuben Lloyd, was banded and released by him at Last Mountain Lake, Saskatchewan, on July 30, 1923, and died of injuries on June 30, 1924, after being captured at Markham, Texas.

AMERICAN BITTERN, No. 204,802, nestling, banded by R. H. Carter, at Muscow, Saskatchewan, on July 1, 1923, was captured at Burr Oak, Kansas, about September 14, 1923.

*Published by authority of the Canadian National Parks Branch, Department of the Interior, Canada.

BLACK-CROWNED NIGHT HERON, No. 233,847 banded by W. F. Fogg, at Barnstable, Massachusetts, on June 16, 1923, was killed on the north shore of the St. Lawrence River, within a few miles of the City of Quebec, on September 9, 1923.

BLACK-CROWNED NIGHT HERON, No. 233,871, banded by L. B. Fletcher, at Barnstable, Massachusetts, on June 16, 1923, was found dead on Amherst Island, Lake Ontario, on November 1, 1923. Apparently the bird had died shortly before it was found.

COOT, No. 210,951, adult female, banded by Herman Battersby, at Oak Lake, Manitoba, on May 26, 1923, was killed in Lake Jefferson County, Minnesota, on October 26, 1923.

RED-TAILED HAWK, No. 204,807, nestling, banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on July 1, 1923, was killed at Randall, Iowa, on October 31, 1923.

NORTHERN FLICKER, No. 110,921, banded by R. H. Carter, Jr. at Muscow, Saskatchewan, on May 23, 1923, was killed near Terrill, Texas, about October 20, 1923.

CROW, No. 209,658, nestling, banded by Theed Pearce, at Comox, Vancouver Island, British Columbia, on June 17, 1923, was shot at Parksville, British Columbia, on November 3, 1923.

CROW, No. 211,165, nestling, banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on June 24, 1923, was shot at Warner, South Dakota, on April 18, 1924.

CROW, No. 208,705, fledgeling, banded by Adolf L. Holm, at Otto, Manitoba, on July 8, 1923, was caught in a wolf trap near Bronson, Minnesota, on May 22, 1924.

CROW, No. 208,665, banded by Philip F. Foran, at Banff, Alberta, on July 18, 1923, was picked up dead in the same locality about August 5, 1923.

BRONZED GRACKLE, No. 108,966, adult male, banded by Hoyes Lloyd, at 406 Queen Street, Ottawa, Ontario, on April 29, 1923, was found injured at the corner of Laurier Avenue and Percy Street, Ottawa, on September 11, 1923. The bird afterwards died.

BRONZED GRACKLE, No. 108,976, fledgeling, banded by Hoyes Lloyd, at Ottawa, Ontario, on June 13, 1923, is believed to have been eaten by a cat in the same vicinity shortly after it was banded.

BRONZED GRACKLE, No. 109,874, banded by H. C. Arnold, at Davidson, Saskatchewan, on June 19, 1923, was found dead at a place six miles south-east of the banding station, on May 22, 1924.

GRACKLE, No. 109,878, banded by H. C. Arnold, at Davidson, Saskatchewan, on June 19, 1923, was killed at a place one mile north of Ortonville, Minnesota, on May 24, 1924.

VESPER SPARROW, No. 43,682, banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on May 20, 1923, was badly injured by the trap and was found dead in the same locality on June 2, 1923.

CHIPPING SPARROW, No. 59,449, banded by Wilfrid Scott, at Guelph, Ontario, on June 22, 1923, was found dead in the same locality, on June 24, 1923.

SONG SPARROW, No. 44,541, banded by Edward C. Knechtel, at Long Branch Park, Ontario, on April 15, 1923, built its nest in a vacant lot near the place where it was banded, and was seen several times until June 14, 1923, when its nest was found broken up. It is believed that this bird and its young were eaten by a cat.

SONG SPARROW, No. 52,399, immature, banded by Ralph E. DeLury, at Ottawa, Ontario, on July 29, 1923, was re-caught in another trap at the same station, on August 11, 1923, and, on August 12, 1923, while it was repeating in another trap at the same station, it was killed in the trap.

BARN SWALLOW, No. 36,588, adult, banded by Adolf L. Holm, at Otto, Manitoba, on July 2, 1923, was found dead at Ashby, Minnesota, during the latter part of May, 1924.

CEDAR WAXWING, No. 78,376, nestling, banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on July 24, 1923, was found dead in the nest in which it was banded, on July 29, 1923.

CEDAR WAXWING, No. 78,377, nestling, banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on July 24, 1923, was found dead in the nest in which it was banded on July 29, 1923.

CEDAR WAXWING, No. 78,378, nestling, banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on July 24, 1923, was found dead in the nest in which it was banded on July 29, 1923.

CEDAR WAXWING, No. 78,379, nestling, banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on July 24, 1923, was found dead in the nest in which it was banded on July 29, 1923.

ROBIN, No. 16,114, juvenile, banded by Philip F. Foran, at Ottawa, Ontario, on May 26, 1923, was found dead at Hull, Quebec, on or about August 10, 1923.

ROBIN, No. 16,115, nestling, banded by Philip F. Foran, at Ottawa, Ontario, on May 26, 1923, died in the same locality, on June 14, 1923.

ROBIN, No. 18,937, immature, banded by Ralph E. DeLury, at 330 Fairmont Avenue, Ottawa, Ontario, on June 12, 1923, was found dead on Golden Street, Highland Park, Ottawa, Ontario, during the month of May, 1924.

ROBIN, No. 71,831, banded by Philip F. Foran, at Ottawa, Ontario, on June 14, 1923, was found dead at the same station, on June 17, 1923.

ROBIN, No. 71,850, banded by Philip F. Foran, at Banff, Alberta, on July 28, 1923, was found dead at a place fifty yards from where it was banded, on July 31, 1923.

(Continued in February issue)



IN MEMORIAM

MONTAGUE CHAMBERLAIN

Died at Boston, Mass., December, 1924

A little while ago (*The Canadian Field-Naturalist*, XXXVII, 1923, p. 40) we had occasion to call attention to Montague Chamberlain, one of our distinguished predecessors in Canadian ornithology. It is now our sad duty to record his final passing.

Mr. Chamberlain was born in St. John, New Brunswick, April 5, 1844, received his education in the private schools of that city, and remained in business there until 1887. In 1889 he was appointed Assistant Secretary to the Harvard Corporation, Cambridge, Mass.. Later and until 1900 he was Secretary to the Lawrence Scientific School. In 1907 he married Miss Anna Sartoris Prout of Petersburg, Virginia, who died in 1913. After this he turned back to his old New Brunswick home for a while, but his last years were spent in the Boston vicinity again, engaged in the recreation of horticulture, especially in the cultivation of gladiolas.

Mr. Chamberlain was one of the leading ornithologists of his earlier days. He became Corresponding Member of the Nuttall Club in 1881 and

a Resident Member in 1885. He was one of the Founders of the American Ornithologists' Union. He was also interested in Anthropology and in 1889 published a *Maliseet Vocabulary* and *The Penobscot Indians*. In 1904 he established a library of over a thousand volumes for the Indians at Old Town, Maine.

His ornithological publications relate mainly to Canada. The *Nuttall Bulletin* and the early numbers of *The Auk* contain many notes from his pen. His major ornithological works are: *A Catalogue of the Birds of New Brunswick*, *Bull. Nat. Hist. Soc. of N.B.*, 1882, *A Catalogue of Canadian Birds*, 1887; *Birds of Greenland*, 1891; an edition of *Nuttall's Manual* that went through three editions, 1891, 1896, and 1903; and a brief account of *Some Canadian Birds*, 1895.

It is unfortunate for us that Mr. Chamberlain did not continue his ornithological activity to the end; we had much to expect from him. However, he was one of the pioneers of Canadian ornithology and it is owing largely to his work that many of our paths are smooth and straight, as he and his generation prepared the way for us as we are doing for those of the future.—P. A. T.

STATEMENT OF THE FINANCIAL STANDING OF THE OTTAWA FIELD-NATURALISTS' CLUB AT THE CLOSE OF THE YEAR 1923-1924

November 27, 1924

LIABILITIES		ASSETS	
Ottawa Composition Co. Ltd.	\$398.40	Cash on hand	\$9.98
		Unpaid Membership Dues, 1923	16.50
		Unpaid Membership Dues, 1924	76.50
		Bills Receivable	288.88
		Deficit	6.54
	398.40		\$398.40
RECEIPTS		DISBURSEMENTS	
1 Jan., 1924—		To Ottawa Composition Co. Ltd.	\$1188.20
By Balance on hand	\$26.10	Ottawa Composition Co. Ltd., Reprints	90.53
MEMBERSHIP DUES—		Ottawa Composition Co. Ltd., Illustrations	188.90
Current	682.12	Job Printing and Stationery, etc.	57.37
Arrears	70.50	Postage	38.65
Advance	30.00	Exchange	9.90
Affiliated Societies	60.40	Editors' Honoraria, 1921 and 1924	100.00
Advertisements in magazine	105.01	Ottawa Composition Co. Ltd. (for Special Edition, Saskatchewan)	350.00
Back Numbers and Volumes sold	71.06	Balance	9.98
Reprints and Illustrations	172.84		
Grant from Government of Ontario	200.00		
Donations	251.75		
Interest on Bond	13.75		
Province of Saskatchewan (for Special Edition)	350.00		
	\$2033.53		\$2033.53

OTTAWA FIELD-NATURALISTS' CLUB,
B. A. FAUVEL,
Treasurer

Audited and found correct, December 27, 1924.
A. E. BATEMAN.

STATEMENT TRUST FUNDS COMMITTEE

	Receipts	Expenditures	Receipts	Expenditures
Cash on hand, Dec. 31, 1923....	\$497.51		Interest payment to general club funds, 1923-24.....	13.75
Received from R. B. Whyte Est.	100.00		Interest payment to general club funds, 1924-25.....	10.45
Interest from Bank.....	10.45		Cash in Bank, Jan. 9, 1925....	70.32
Interest on Bond.....	13.75			
Purchase of Victory Bond, 1934 at \$103.50.....	\$517.50			\$621.71 \$621.71
Brokerage.....	1.25			W. T. MACOUN, <i>Chairman</i>
Interest on Bond from May 1st to Aug. 22nd.....	8.44		Audited and found correct,	A. E. BATEMAN

NOTES AND OBSERVATIONS

Subscriptions for 1925 are now due; by paying promptly you will aid greatly in the efficient publishing of the magazine. The subscription for the year is \$1.50; payment should be made to the Treasurer, Mr. B. A. Fauvel, 321 McLeod St., Ottawa, Ontario. If paying by personal cheque, please include exchange.

CHRISTMAS BIRD CENSUSES, 1924

VICTORIA DISTRICT, BRITISH COLUMBIA—(Date?—Ed.).—42 miles by automobile, 6 miles on foot. District covered—Shoal Bay, Oak Bay, Cedar Hill, Colquitz Creek, Beaver Lake, Portage Inlet, Victoria Harbour. Weather clear and frosty, bright sunshine and light north breeze all day. There has been hard frost since December 16, but no snow has fallen. All lakes, winter ponds, and sheltered portions of salt-water inlets are frozen.

Such common species of landbirds as Brewer's Blackbird, Red-winged Blackbird and Screech Owl were not encountered, although these had been seen during the preceding week. All the water-birds listed, with the exception of Wilson's Snipe, were found on the Victoria Harbour Bird Sanctuary.

Western Grebe, 1; Holboell's Grebe, 1; Horned Grebe, 13; Pied-billed Grebe, 2; Pacific Loon, 1; Glaucous-winged Gull, 365; Herring Gull, 1; Short-billed Gull, 240; Brandt's Cormorant, 2; Pelagic Cormorant, 6; Red-breasted Merganser, 6; Mallard, 1; Baldpate, 18; Pintail, 2; Canvasback, 150; Scaup Duck, 540; Golden-eye, 50; Buffle-head, 36; Harlequin Duck, 6; White-winged Scoter, 25; Surf Scoter, 50; Northwestern Coast Heron, 1; Coot, 40; Wilson's Snipe, 2; Aleutian Sandpiper, 3; Red-backed Sandpiper, 40; Ruddy Turnstone, 1; Black Turnstone, 16; California Quail, 47; Chinese Pheasant, 6; Sharp-shinned Hawk, 1; Belted Kingfisher, 2; Harris's Woodpecker, 1; Gairdner's Woodpecker, 4; Red-shafted Flicker, 3; Steller's Jay, 10; Northwestern Crow, 9; Western Meadowlark, 16; Oregon

Junco, 21; Rusty Song Sparrow, 44; Fox Sparrow, 7; Oregon Towhee, 5; Anthony's Vireo, 2; Seattle Wren, 3; Western Winter Wren, 7; Red-breasted Nuthatch, 2; Chestnut-backed Chickadee, 13; Western Golden-crowned Kinglet, 29; Western Robin, 1; Varied Thrush, 8. Total, 50 species, 1850 individuals.—J. A. MUNRO.

LAKE COWICHAN, V.I., B.C., DECEMBER 24, 1924.—Tenth day of an abnormal cold period. High easterly winds most of the time. Fewer birds seen than in former years at the same time. Food supply poor; berry crops and coniferous seed crop both a failure in 1924. In the following list the approximate numbers sighted are given.

Western Grebe, 2; Horned Grebe, 5; Pied-billed Grebe, 8; Loon, 2; Marbled Murrelet, 8; Glaucous-winged Gull, 25; Merganser, 5; Mallard, 3; Scaup Duck, 10; Ring-necked Duck, 8; Golden-eye, 50; Buffle-head, 20; Surf Scoter, 5; Northwestern Coast Heron, 1; Coot, 30; Oregon Ruffed Grouse, 2; Ring-necked Pheasant, 8; Sharp-shinned Hawk, 1; Bald Eagle, 2; Pygmy Owl, 2; Belted Kingfisher, 2; Steller's Jay, 12; Oregon Jay, 8; Oregon Junco, 10; Rusty Song Sparrow, 8; Oregon Towhee, 2; Dipper, 1; Chestnut-backed Chickadee, 50; Western Golden-crowned Kinglet, 20; Varied Thrush, 10. Total, 30 species, 320 individuals.—G. BUCHANAN SIMPSON.

COMOX VALLEY, VANCOUVER ISLAND, B.C., DECEMBER 24, 1924, 9.45 a.m. to 4.30 p.m. (with break 2 to 2.30).—From Courtenay to Comox (along river one mile, seashore 3 miles to Comox, inland and round to seashore and back same way 3 miles). Seven miles, on foot. Bright sun all day, no wind, freezing in shade all day. Observers together.

Holboell's Grebe, 1; Horned Grebe, 12+; Loon, 9; Pacific Loon, heard; Red-throated Loon, 2; Marbled Murrelet, 5; Glaucous-winged Gull, 1350+; Short-billed Gull, 14; Cormorant (Vio-

let-Green?), 2; American Merganser, 2; Red-breasted Merganser, 4; Mallard, 450+; Baldpate, 420; Pintail, 2; Scaup, 1200+; American Golden-eye, 250+; Buffle-head, 50+; American Scoter, 29+; White-winged Scoter, 200+; Surf Scoter, 200+; Black Brant, 6; Heron, 5; Coot, 15; Snipe, 2; Red-backed Sandpiper, 2; Killdeer, 8; Chinese Pheasant, 18; Goshawk, 1; Hawk (most likely dark phase of Red-tail, otherwise Rough-leg), 1; Peregrine Falcon, 1; Screech Owl, 1; Kingfisher, 4; Harris's Woodpecker, 1; Red-breasted Sapsucker, 1; Flicker, 7; Stellar's Jay, 6; Crow, 158+; Meadowlark, 4; Brewer's Blackbird, 1; Purple Finch, 30; English Sparrow, heard; Oregon Junco, 60+; Rusty Song Sparrow, 24; Fox Sparrow, 8; Oregon Towhee, 10; Seattle Wren, 2; Winter Wren, 6; Chickadee, 7; Kinglet, 6; Hermit Thrush, 2; Robin, 3; Varied Thrush, 19. Total, 52 species, 4623+ individuals.

The number of ducks seen was far more than shown above, but the bright glare prevented identification; there might very well have been a thousand each of the American and White-winged Scoters.

The Hermit Thrushes were seen three miles apart and another was seen a few days previously.

The Glaucous-winged Gulls were nearly all counted on the river, feeding on dead dog salmon.

On the 25th of December, and again on the 27th, a Golden-crowned Sparrow was feeding at feeding-station at Courtenay.—R. M. STEWART AND THEED PEARSE.

N.B.—Compared with a census taken two years ago (but not published), the conspicuous absence is the Bald Eagle, three then; and Western Grebe, then 1000; but this number was seen a few days before in 1924. The greater number of Glaucous-wings, accounted for by the salmon. Fewer Golden-eyes, but more Mallards. Song Sparrows, 24, as against 9. 10 Towhees against none and 19 Varied Thrushes (very numerous this year) against none. One Brewer's Blackbird and no Redwings as against 200 and 30, which is the usual number that winter here.

This year we have had an unusually long spell of cold weather for these parts with low temperatures.—THEED PEARSE.

LONDON, ONTARIO.—Our Christmas Census this year was taken under weather conditions very different from those that prevailed in 1923. Then it was very open and mild, whilst these year the thermometer had been hovering around zero for about a week. The day decided upon was Saturday, the 27th, and as usual a number of parties were sent out, each working independently, the results being combined into one list at the close of the day. Fewer observers took part and a

smaller territory was covered than in 1923, but the total number of species was approximately the same. The number does not vary greatly from year to year, the only exception being 1922, when a number of very unusual records were made, as will be seen from the account published in *The Canadian Field-Naturalist*.

The day was rather cold, the thermometer registering 19° at 8.00 a.m., rising to 23° at 1.00 p.m., and falling again to 10° at 6.00 p.m., but a very strong north-west wind made it seem a great deal colder when one was crossing the open fields, and few, if any, birds were found in such situations, nearly all having sought shelter in the woods and thickets. One party started out in the morning, but a heavy snow storm made observations almost impossible, and apart from visiting the "Dump", where the Starlings and Sparrows board, and calling at a few feeding stations maintained by members of the Club, they did not have much luck. The afternoon parties, three in number, were more fortunate in regard to weather, although it started to snow again about 4.30 p.m. and was soon too dark to see many birds. The course followed in the afternoon was, roughly speaking, the valley of the Thames River for a distance of eight miles or so.

This year we have included in our list the English Sparrow, something we have never done heretofore, but an increasing number of observers report it to *Bird-Lore* each year and there seemed no good reason for omitting it when we were showing two other aliens, the Starling and the Pheasant.

The list which follows contains practically all the regular winter birds, and is rather remarkable for two things, first, the absence of all northern species (Crossbills, Grosbeaks, etc., including even Snowbirds) and, secondly, the absence of summer left-overs (Grackles, Meadowlarks, etc.), the Song Sparrows hardly being classed in this category, as there are always some of them here each winter.

American Golden-eye, 12; Ruffed Grouse, 1; Pheasant, 1; Red-tailed Hawk, 1 (calling loudly); Screech Owl, 1; Kingfisher, 2; Hairy Woodpecker, 2; Downy Woodpecker, 8; Blue Jay, 8; Crow, 597; Starling 12; Goldfinch, 5; English Sparrow, 500; Tree Sparrow, 3; Slate-colored Junco, 2; Song Sparrow, 3; Cardinal, 11; Brown Creeper, 6; White-breasted Nuthatch, 9; Black-capped Chickadee, 70; Golden-crowned Kinglet, 33. Total, 21 species, 1287 individuals.—MCILWRAITH ORNITHOLOGICAL CLUB, E. M. S. DALE, Secretary.

HAMILTON, ONTARIO.—The Hamilton Bird Protection Society Inc. made its annual count of the winter birds on Saturday, December 27, when seven members went out in four parties, one in

the morning and three in the afternoon. The territory covered was much the same as that covered a year ago, except that this year none went east of Wentworth Street and one party made a short excursion back from the "Mountain Brow" (the Niagara Escarpment), where the Waxwings were seen. The winter season so far has been disappointing in the number of birds seen, even regular visitors to feeding stations being scarce. The previous two weeks were unusually cold for the time of year and the locality, zero temperatures being experienced on several nights; but birds were scarce before this cold weather set in. In addition to the species seen on the census walk, the following have been reported from the same territory: Screech Owl, about December 24; Black-capped Chickadee, December 27; Purple Sandpiper, 1; White-winged Scoter, 1; Crow, all on December 28. The census returns follow:

HAMILTON, ONTARIO, CANADA.—(South and west limits of city, park, garden, and waste land, among trees and in open; and south shore of Dundas Marsh.)—December 27, 10—11.45 a.m. and 1—5 p.m. Snowing a.m., clear p.m.; 2 in. to 6 in. of snow; wind west, strong at first, but falling during p.m.; temp. 21° at start, 15° at return. Eleven miles on foot. Observers in four parties, one a.m. and three in p.m. Herring Gull, 19; Ring-billed Gull, 2; Red-shouldered (?) Hawk 2; Unidentified Hawk, 2; Hairy Woodpecker, 1; Downy Woodpecker, 8; Blue Jay, 2; European Starling, 1; Tree Sparrow, 44 (flocks of 2, 10, 12, and 20); Slate-coloured Junco, 5; Song Sparrow, 5; Cedar Waxwing, 15 (two flocks); Golden-crowned Kinglet, 8 (one flock). Total, 12 species, 114 individuals. The Song Sparrows were along the banks of a small, open stream, blotch on centre of breast noted on two, G. O. McM.—MISSIS R. R. MILLS, E. O. SMITH, M. HEWSON, DR. G. O. McMILLAN, MESSRS. H. C. NUNN, ROGER NUNN, D. A. BAXTER, ROLAND BROWN.

TORONTO, ONTARIO.—Christmas Day of 1924 dawned at Toronto a typical Canadian winter day. The thermometer stood a few degrees above zero, but a fresh wind made it seem a few degrees below. The cold winter sun shone brightly on a few inches of freshly fallen snow.

Three parties ventured out to represent the Toronto Field-Naturalists' Club and report on birds seen for the Christmas census. Officially these started from their respective meeting points at 9.30 a.m., but two members of one group had already tramped a couple of hours before joining the main party. With a view to covering as many kinds of country as possible the parties were arranged so that one traversed the lake front east from the mouth of the Humber River and part of

High Park, another the northern part of High Park, taking in the upland woods and the valleys of frozen marshes and thickets, while a third party met and observed in the wooded ravines of the Don and its tributaries and in open fields and weed patches in the vicinity.

The strong, cold wind made the observations in the open country very meagre, but strangely enough did not seem to reduce the bird life of the open water, where many water birds were observed. In the sheltered woods and particularly in the wooded ravines there were, of course, the regular winter residents to be found, as well as one or two surprises.

The party assigned to the waterfront was by far the most successful, both in number of species and in numbers of individuals. Perhaps this was the just reward of the enthusiasm that prompted a start two hours earlier than the time agreed upon.

The observations of all parties combined are as follows: Loon, 5; Great Black-backed Gull, 2; Herring Gull, 44; Ring-billed Gull, 10; American Merganser, 200; Hooded Merganser, 4; Golden-eye, 18; Old-squaw, 6; Hawk (Sharp-shinned?), 1; Hairy Woodpecker, 1; Downy Woodpecker, 3; Tree Sparrow, 15; Slate-colored Junco, 4; Song Sparrow, 3; White-breasted Nuthatch, 3; Chickadee, 3; Golden-crowned Kinglet, 5; American Robin, 1. Total, 18 species, 328 individuals.

Two English Starlings were seen at close range in the northern part of the city on December 26.

Two other observers in the city report Hairy Woodpecker, 2; Downy Woodpecker, 6; Slate-colored Junco, 11; Brown Creeper, 2; White-breasted Nuthatch, 4; Chickadee, 10; and American Robin, 1; all seen on Christmas Day.—STUART L. THOMPSON, *Chairman of Bird Group, Toronto Field-Naturalists' Club.*

THE SNAKE RIVER (Osceola to Lake Doré) AND MICKSBURG REGION, ONTARIO.—December 24; 7.15 a.m. to 5.20 p.m. Overcast and partially bright, snowing from 4 to 5 p.m. Four inches of snow; wind southwest to west, moderate; temperature 31° to 35°; about 30 miles on foot. Canada Ruffed Grouse, 5; Cooper's Hawk, 1 (also 21st and 28th); Goshawk, 1 (ad.); Hairy Woodpecker, 2; Northern Pileated Woodpecker, 1; Horned Lark (subsp.?), 1; Northern Raven, 1; Redpoll, about 30; Goldfinch, 1; Snow Bunting, several; Northern Shrike, 1; Brown Creeper, 4; Red-breasted Nuthatch, 6; Chickadee, about 50; Brown-capped Chickadee, 1; Golden-crowned Kinglet, 2. Total, 16 species, about 112 individuals. Also seen during previous month: November 30, Crow; December 4, Pine Siskin; December 7, Tree Sparrow; December 7, 14 and 21, Blue Jay. A White-breasted Nuthatch was seen on

December 28. Goshawk seen at only a few yards' distance, revealing the black crown and the vermiculations on the lower parts to excellent advantage. —E. W. CALVERT.

OTTAWA, ONTARIO.—On December 28, eighteen Ottawa bird observers set out in twos and fours on seven different routes, as follows, in order from the North line, in direction NESW: *First Party*, C. L. Patch and R. S. Finnie, *E.* along the south bank of the Ottawa River; 12 miles; 10.15 a.m. to 3.10 p.m. *Second Party*, C. E. Johnson and C. M. Sternberg, *SSE.* from Billings Bridge along the Metcalfe Road; 9 miles; 10.00 a.m. to 3.30 p.m. *Third Party*, D. B. DeLury, R. E. DeLury, J. H. Magee and G. L. Smith, *S.* through the Experimental Farm along the Rideau Canal and River to Black Rapids; 16 miles; 8.00 a.m. to 3 p.m. *Fourth Party*, D. Blakely and C. B. Hutchings, *SW.* along the south bank of the Ottawa River, Holland Avenue to Shirley's Bay; 12 miles; 9.30 a.m. to 1.30 p.m. *Fifth Party*, H. F. Lewis, B. A. Fauvel, R. Lockwood and H. Wright, *S.W. by W.* along the north bank of the Ottawa River, Val Tetreau, P.Q., to Aylmer, P.Q. and beyond; 15 miles; 8.30 a.m. to 4.30 p.m. *Sixth Party*, P. Foran and W. H. Lancely, *NW.*, Old Chelsea to Fairy Lake vicinity and Royal Ottawa Golf Club; 16 miles; 9.45 a.m. to 3.15 p.m. *Seventh Party*, H. Lloyd and H. I. Smith, *NNW.*, Kirk's Ferry, P.Q. to Gatineau Point, P.Q., *E.* side of Gatineau River, 13 miles; 9.40 a.m. to 6.30 p.m. The day was cold, being 18°F. below zero when the first observers started out at 8 a.m., and 7°F. when the last returned at 6.30 p.m. The cloudiness varied from one-tenth to eight-tenths overcast; the winds were light, shifting northwesterly to northeasterly at both high and low altitudes; the ground was almost bare in some places and several feet deep in snow in others due to drifting; but on the average the snow was about 6 inches deep. As the routes taken are now quite definitely established, it seems advisable to give in the following table the records for each route, in order that bird students in the years to come may make more definite use of the comparisons from year to year:

Party.	1	2	3	4	5	6	7	Totals
SPECIES								
Merganser (sp.?)	1	..	..	1	..	2
Am. Goldeneye	14	..	..	14
Duck (sp.?)	1	1
Ruffed Grouse	..	2	3	..	..	..	..	5
Goshawk	..	1	..	..	..	..	..	1
Hairy Woodpecker	..	1	1	..	..	1	3	6
Downy Woodpecker	1	1	5	..	1	10
Blue Jay	..	1	3	..	1	5	..	10
Crow	..	25	131	11	4	..	..	171

Starling	85	1	..	..	..	..	86
Purple Finch	..	..	..	..	8	..	8
Redpoll	..	2	..	..	..	..	2
Goldfinch	..	..	15	2	..	..	17
Pine Siskin	1	1	8	..	720	730	
Snow Bunting	..	8	..	..	..	..	8
Tree Sparrow	15	..	..	..	..	..	15
Song Sparrow	..	..	2	..	..	..	2
Northern Shrike	..	1	..	..	..	..	1
Brown Creeper	..	1	..	..	..	..	1
Wh.Br.Nuthatch	..	3	6	2	..	6	17
Red. Br. Nut-hatch	..	..	..	4	..	6	10
Chickadee	9	9	11	48	5	34	116
Robin	..	..	..	1	..	..	1

Totals of Birds	10	142	171	26	96	12	781	1234
Totals of Species	2	10	13	4	10	4	9	22

(Species seen recently but not included in the census: Bluebird, for the week ending December 21st, on which date it was banded by R. E. DeLury; and Golden-crowned Kinglet, seen on December 25th at Fairy Lake, H.L.)

It may be noted that this is the first time the Starling has appeared on the Ottawa Christmas Census. The one seen by the Third Party was flying from the neighborhood of a barnyard; while the 85 recorded by the Second Party were observed feeding at the Bronson Avenue garbage dump, along with House Sparrows and Crows. The Starling has evidently come to stay with us in Ottawa. (The Starlings seem to withstand easily the intense cold, and some 30 of them are feeding at the "dump" at the time of writing, January 18.)—RALPH E. DELURY.

LANCASTER, ONTARIO (54 miles west of Montreal).—December 25th, 10 a.m. to 12.30 p.m., temperature 20°, partly clear; 8 inches of snow on ground. Ruffed Grouse, 1; Downy Woodpecker, 1; Pine Siskin, 15; White-breasted Nuthatch, 2; Black-capped Chickadee, 12; Total, 5 species, 31 individuals.

Also seen at Montreal: December 24, Merganser, 3; Crow, 5; Snow Bunting, 10; Robin 1; December 28, Starling, 3.—L. MCL. TERRILL.

ST. STEPHEN, N.B., TO DEER ISLAND, N.B., AND RETURN.—On December 24 went from St. Stephen to Deer Island, 30 miles by automobile and 7 miles by motorboat. Returned by same route on December 26. The following birds were seen during the three days, December 24-25-26. Pied-billed Grebe, 1; Common Loon, 4; Black Guillemot, several; Murre (sp.), several; Jaeger (sp.), 1; Glaucous Gull, 1; Herring Gull, hundreds; Terns (sp.) (?—Ed.), many; Cormorant (sp.) several; Merganser (sp.), 3; Black Duck, several; Green-winged Teal, 2; Blue-winged Teal, 2; American Golden-eye, several; Barrow's

Golden-eye, 1; Buffle-head, several; Old-squaw, several; Harlequin Duck, 4; Eider Duck, 2; American Scoter, several; White-winged Scoter, several; Surf Scoter, several; Short-eared Owl, 1; Richardson's Owl, 1; Saw-whet Owl, 1; Great Horned Owl, 1; Hairy Woodpecker, 1; Crow, 25; Pine Grosbeak, 12; Red-breasted Nuthatch, 15; Black-capped Chickadee, 25; Kinglet (sp.?), several; Robin, 500. A total of 33 species.

On my arrival at Deer Island, N.B., I saw about 200 Robins feeding on the berries of the Rowan tree and then they went to the mud-flats and were feeding about the seaweed and mud and were bathing in the cold water that ran from freshwater streams. About two miles from this point 200 more were seen and a quarter of a mile in another direction were seen about 100—a total of 500 in a distance of two and a quarter miles. These birds were still on the island on December 26 and in the morning were singing from the tree tops.

I have the following records of Canada Geese in December, 1924:

December 7. Several flocks at St. Stephen, N.B.

December 8. Several flocks at St. Stephen, N.B.

December 14. Some stayed to feed on the St. John River.

December 17. Two flocks at St. Stephen.

December 18. One flock. Some staying in St. Croix River to feed.—J. S. LORD.

A LARGE GORGONIAN FROM ALASKA.—Recently a branchlet of the tree-shaped arctic gorgonian (*Primnoa lepadifera*) was submitted to me for identification by the United States National Museum officers, with the statement that it was from a magnificent specimen seven feet high! It lacked the base and may have been only a branch of a much larger example. This, however, is larger than any known to me from the North Atlantic. In life the color is bright pink or light scarlet.—A. E. VERRILL.

Professor A. E. Verrill, emeritus professor of zoology of Yale University, writes to the *Naturalist* enclosing a note on a large Gorgonian from Alaska. Dr. Verrill is well known to Canadian marine biologists for his extensive monographs on the marine life of our Atlantic and Pacific coasts, and more recently for his reports on the Alcyonaria and Actinaria of the Canadian Arctic Expedition, 1913-18, 170 pages, 32 plates, published in 1922. He is still actively interested in field work at the age of eighty-five, and was sailing in October for a protracted stay in the Hawaiian Islands, where he expects to make collections for some museums. His address is given as Lihue, Kauai Island, Hawaiian Territory.—R.M.A.

Peromyscus maniculatus bairdii AT TORONTO.—The capture of several specimens of Baird's White-footed Mouse at Toronto makes a further north-easterly extension to its known range (See Soper,

Journal of Mammalogy, Vol. 4, No. 4, pp. 247-248), and adds a new form to the Toronto list. The first specimen, No. 24.2.2.3 in the Royal Ontario Museum of Zoology, was taken on February 2, 1924, in open ground near Eglinton Avenue W., by W. J. LeRay. Mr. LeRay also took specimens of this mouse at Ashbridge's Bay, which would indicate that *bairdii* is to be found in favorable localities throughout the Toronto region.

—L. L. SNYDER.

MR. RODNEY WOOD, who has been located in Canada with headquarters at Ottawa for about three years, has left for Nyassaland. While in Canada, Mr. Wood was Dominion Camp Chief of the Boy Scouts Association. He is familiar with several fields of natural history, perhaps more particularly with entomology, and it was a pleasure to have the opportunity of helping to introduce him to Canadian birds. He needed little help, however, and mastered the field identification of new species in surprisingly short time. The Dominion Headquarters of the Boy Scouts Association recently published *Animal Tracking for Boy Scouts*, which was prepared under Mr. Wood's personal direction.

Canada's loss is Africa's gain, and the members of the Club wish Mr. Wood success in his return to his estate in that distant part of the empire. It is believed that he is the only member of the Club who resides in Africa. Those members who may wish to communicate with Mr. Wood should address him at Magombwa Estate, P.O. Cholo, Nyassaland, via Cape Town, Africa.—HOYES LLOYD.

REPORT OF THE COUNCIL, OTTAWA FIELD-NATURALISTS' CLUB, 1923-24.—Council reports a busy year for 1923-24. In all, eight meetings were held, with an average attendance of fifteen members. Many of these meetings were held at councillors' homes and pleasant social chats followed the business session. It certainly would be amiss not to express in this report sincere thanks to those members who so kindly entertained us in their homes, and to the various committees and councillors for their interest in the work.

After the appointment of the various committees for the year, one of the first problems investigated was the financial standing of the club and its source of revenue. It was found that the club started the year with a deficit of \$146.00. Through the energy of the President in selling back sets of the *Naturalist*, this deficit has been reduced to about \$6.00. Use of the Trust Funds of the club was given consideration and the interest was offered as prizes for the best plant, insect, and

nature photograph collections. Other prizes were donated by Dr. Ami for the best archaeological and palaeontological collections, and by Dr. Malte for the best botany collections.

A Publication Fund was established, to which the Province of Quebec Society for the Protection of Birds contributed \$125.00. Many other important contributions have been received and acknowledged in the *Naturalist*.

A serious shock to Council was the announcement that the Ontario Government had cancelled the \$200.00 grant, which had been paid annually to the Club since 1898. The importance of the continuance of this grant was emphasized to the Premier of the Province, and it was urged that the grant be increased from \$200.00 to \$500.00.

The Canadian Field-Naturalist, the official publication of the club and its affiliated societies, has completed a successful year, and Volume 38 contains much important scientific information, together with many illustrations. A special number on the "Birds of Saskatchewan" was published last May in cooperation with the Government of Saskatchewan.

The Toronto Field-Naturalists' Club was added last March as a new and important affiliated Society. Negotiations are in progress and it is hoped in the near future to affiliate with several other Natural History Societies. We now have ten affiliated societies.

Many other items of business were transacted and the above are only a few of the items of general interest.—J. F. WRIGHT, *Secretary*.

ANNUAL MEETING OF OTTAWA FIELD-NATURALISTS' CLUB.—The forty-sixth Annual Meeting of the Ottawa Field-Naturalists' Club was held Tuesday evening, December 2nd, 1924, in the auditorium of the Victoria Memorial Museum. President Hoyes Lloyd, in opening the meeting, told of some of the ways in which the Club was attempting to spread interest in natural history throughout Canada, and emphasized the most recent method, namely, by radio. The Minutes of the previous Annual Meeting, the Report of the Secretary of Council and the Treasurer's Report

were then read and adopted. The election of officers followed. The slate presented by Council was elected and the officers and additional council members for 1924-25 are as follows: President, Mr. Hoyes Lloyd; first vice-president, Mr. G. A. Miller; second vice-president, Mr. Norman Criddle; treasurer, Mr. B. A. Fauvel; secretary, Dr. J. F. Wright; additional members of council, Miss M. E. Cowan, Miss Faith Fyles, and Messrs. W. T. Macoun, A. Halkett, C. E. Johnson, Frits Johansen, C. M. Sternberg, H. I. Smith, F. W. Waugh, P. A. Taverner, E. Sapir, E. M. Kindle, W. J. Wintemberg, R. E. DeLury, Arthur Gibson, M. O. Malte, R. M. Anderson, H. Groh, C. B. Hutchings, H. M. Ami, C. L. Patch, D. Jenness, and H. F. Lewis. The Auditors elected for 1924-25 are A. E. Bateman and C. W. Twinn.

Following the brief business session Mr. Harrison F. Lewis of the Canadian National Parks staff and Editor-in-Chief of *The Canadian Field-Naturalist* gave a highly educational lecture on "Sea Birds" and showed, for the first time in Canada, 6 reels of moving pictures of the sea birds of the north shore of the Gulf of St. Lawrence or the Canadian Labrador coast. These moving pictures were taken by the Department of Trade and Commerce under the direct supervision of Mr. Lewis and Mr. P. A. Taverner. Many excellent close-up and general scenes of these rare and interesting birds and bird colonies were shown. These moving pictures are interesting and at the same time are of highly educational value, and therefore, it is hoped that, in the near future, they will be shown in many of our Canadian cities.

In closing the meeting President Lloyd conveyed to Mr. Lewis the appreciation of the Club for his splendid address, and also thanked the National Parks Branch for the loan of the films, and the Victoria Museum for the use of their lecture hall. About 300 members and their friends were present.—J. F. WRIGHT, *Secretary*.

For the illustrations in this issue *The Canadian Field-Naturalist* is indebted to Dr. R. E. DeLury, Mr. J. H. Bradley, Jr., and the Topographical Survey of Canada.—EDITOR.

BOOK REVIEW

THE AUK, 1923

Articles pertaining directly to Canadian ornithology.

A BREEDING STATION OF THE HORNED LARK AND PIPIT ON THE GASPE PENINSULA.—By Charles W. Townsend, pp. 85-87.

This paper extends the breeding range of the Eastern Horned Lark and the Pipit south of the Gulf of St. Lawrence.

In the *General Notes* for January, pp. 135-137, Harrison F. Lewis reports a number of notes on, and additions to, the list of birds of the Labrador Peninsula.

Under *Recent Literature* we observe *Ecological Note on the Birds Observed at the Biological Station of the University of Manitoba*, by Wm. Rowan—*Ecology*, Vol. III, 1922, pp. 255-260. An ecological study of the locality at Shoal Lake, eastern Mani-

toba. A list of the birds of this station was published by the same author in *The Auk* in 1922.

A photograph of a young Whooping Crane, taken in Saskatchewan in the summer of 1913 and published in *Bird-Lore* for September-October, 1922, is noted.

Under *Correspondence*, P. A. Taverner presents a circular, *The Genus Debased*, protesting against the too fine splitting of genera. The stand is taken that the *genus* is a division of expediency rather than a hard and fast unit of fact and that excessive multiplication of genera complicates rather than simplifies classification. Any scientific refinement in relationship can be expressed as well in subgenera, which, not being used as terms in the names of the species, will render unnecessary many aggravating changes in nomenclature and make for a simpler nomenclatural system. This circular is signed by the majority of systematic ornithologists of the United States and Canada.

NOTES ON THE BIRDS OF PORCHER ISLAND, B.C.—

By Allan Brooks, pp. 217-224.

Porcher Island is on the British Columbia coast opposite the Queen Charlotte Islands. These notes consist of annotations on fifty species, based on a nine-day visit in September, 1920, and on specimens and reports made by C. de B. Green as a result of a two months' stay there in June and July, 1921. The most notable things in this list are the Steller's Jay, Song Sparrow, and Ptarmigan. The first-named proves to be *annectens*, the Black-headed Jay of the interior, without a tendency towards *carlottae*, as would be expected. Major Brooks regards *caurina* as the breeding form of the Song Sparrow and *rufina* as a migrant, though this is not finally demonstrated. Ptarmigan taken prove to be Alexander's Ptarmigan, the first of the subspecies recorded from Canada.

THE MOURNING DOVE (*Zenaidura macroura carolinensis*) AT PANORA, IOWA.—By L. L. Snyder, of the Royal Ontario Museum, Toronto, pp. 240-244, with an excellent plate.

A good account of occurrence and habits of a nesting pair in the locality named.

BLUE FEATHERS.—By Wilder D. Bancroft, Emile M. Chamot, Ernest Merritt, and Clyde W. Mason, pp. 275-300.

This is a report of an investigation of the source of color in blue feathers, conducted under a grant from the Hekscher Foundation for the Advancement of Research at Cornell University. It is an abstract of a fuller account published in the *Journal of Physical Chemistry*. The final conclusions are summed up as follows:

1. Non-metallic blues of feathers are due to the scattering of blue light by very fine pores in the walls of the outer layer of cells of the barbs of the

feather. This is the blue described by Tyndall, which is commonly observed in turbid media.

2. No blue pigments, and no other structural causes of blue color have been observed in non-metallic blue feathers.

3. Green feathers are essentially the same as blue feathers, except that the blue cells are overlaid by a transparent yellow layer.

NESTING OF THE EVENING GROSBEAK IN NORTHERN MICHIGAN.—By J. Stokley Ligon, pp. 314-316.

This paper describes nests discovered on Whitefish Point, Michigan, in July, 1922. Whitefish Point is within twenty miles of the Canadian shore. The paper is accompanied by two photographs, one of nesting habitat and one of nestling bird.

TURKEY VULTURES IN ALBERTA.—By James E. Horning, pp. 324-325.

A report of the occurrence of Turkey Vultures at Ministick Lake, Alberta, July 2, 1922.

THE MYNAH.—A STUDY IN ADAPTATION.—By Dayton Stoner, pp. 328-330.

This is a note that should make interesting reading for bird lovers in Vancouver and adjacent localities, where the closely related Japanese Starling has gained a footing. Mr. Stoner's report of the effect of this species in the Hawaiian Islands, New Zealand, and Fiji is not reassuring. It has not made good in the destruction of noxious insects, it is dirty and unsightly in nesting habits, and it is supplanting native species.

Under *Recent Literature* is a review, on pp. 346-348, of *A Natural History of the Ducks*, Volume I, by John C. Phillips, Houghton Mifflin Co. This is a monumental work, sumptuously produced, which, when completed, will include all the Ducks of the world. Colored plates from the brushes of the best bird artists are reproduced by the finest processes. Maps represent the distribution of each species and the highest type of printing and book-making art is presented. The only criticism that the present reviewer, who has personally examined the work, would make, is that it is too fine and expensive for such an important work. The substance of the letter press is thoroughly in keeping with the appearance and shows an astounding amount of personal experience and research. Probably more of value regarding the Ducks will be found within its covers than in any other dozen works previously published—yet, instead of being available to every one interested, it is issued in a form that makes it obtainable only by a few wealthy bibliophiles or by large institutions. Most of the species treated of in this volume are extralimital to Canada. Our fellow countryman, Major Allan Brooks, is repre-

sented in it by one colored plate from his brush. In succeeding volumes there will be many more examples of his beautiful work.

Under *Correspondence*, Robert Ridgway, on pp. 371-375, counters the protesting circular, *The Genus Debased*, presented by P. A. Taverner as above noted. He urges the necessity of splitting genera wherever a split seems taxonomically necessary, yet, according to the present reviewer, who is not, however, a disinterested party to the dispute, it does not seem that he has shown any good reason why the desired results cannot be obtained through use of the subgenus, without loss of scientific accuracy and with a great increase of convenience to the general worker.—P. A. T.

(Concluded in the February issue.)

PALAEONTOLOGY OF THE SILURIAN ROCKS OF ARISAIG, NOVA SCOTIA, by F. H. McLearn. *Geological Survey of Canada Memoir 137*, pp. 179, pls. 30, Ottawa, 1924.

This memoir is a valuable addition to Canadian Palaeontology. In a brief introduction the author states that the Arisaig section was chosen because of the good preservation of the Silurian faunas at Arisaig, on the northeast coast of Nova Scotia. The reader is especially invited to note that the correlations and "conclusions are based primarily on Brachiopoda and Pelecypoda, to some extent on Trilobita, and subordinately on Graptolitoidea and Gastropoda". The introduction is accompanied by a sketch map making clear the geographic position of the region and the geological relationship of the formations to be discussed.

There follows a resumé of previous work on these faunas and the development of opinion with regard to their correlation with the Devonian or Silurian rocks of New York, with the evidence given for the final decision of the early writers that they represent a Silurian sea—a decision based on the fossil content correlated in a general way both with New York and English fossils. The relationship is shown between the stratigraphical divisions of the early investigators and the more clearly defined and finely distinguished divisions of the more recent workers.

A short description is given of the location of the more detailed sections, and the limiting

boundaries of the Ordovician below and the Devonian above, followed by the five formations into which the Arisaig series is divided. The formations are subdivided into zones based upon lithological differences or upon the prevalence of certain designatory fossils, with the exception of the Beechhill, the lowest formation, which is considerably thinner than the others. The description of each formation and each zone is accompanied by a bulwark of fossils. Then follows a marshalled array of fossils, giving in comprehensive detail the range of the species in zones as well as formations, with the comparative rarity or frequency of their occurrence. A glance at the long list in this finely worked out table is enough to suggest the picture of the thickly populated, moving, not to say squirming, sea-bottom in Arisaig days. Of the 214 species given, there are 9 new mutations, 17 new varieties, and 79 new species—that is, 105 new fossils, almost fifty per cent.

The remainder of this portion of the text is devoted to the very important question of correlation of the fauna. The author shows a very slight basis of comparison existing between one of the Arisaig divisions and one of the Anticosti divisions, and a stronger resemblance to some of the fauna at Eastport, Maine, but a much more definite and more interesting correlation is made with the fauna of England, Scotland, and Wales. There is a less definite comparison with the Silurian of Norway. These correlations on the eastern and western borders of the Atlantic raise some interesting possibilities as to the migration and distribution of species, particularly as the lowest member, the Beechhill, seems to have more in common with the eastern side of the Atlantic than with the Silurian of the interior of North America. The same can be said, though in a less degree, of the other formations.

The second part of the Memoir is devoted to a detailed description of species very minutely worked out, followed by a complete bibliography. Special emphasis should be laid upon the character of the thirty plates illustrating the species. They are not only very clear and well defined, but the soft tone is exceedingly restful and pleasing to the eye.—A. E. W.



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No. 2

OREGON JAYS

By G. BUCHANAN SIMPSON



SHORT account of an eight-years' friendship with a band of Oregon Jays may be of interest.

In this district (Lake Cowichan, B.C.), these birds are usually to be found in the wilder mountainous regions. In winter, however, they often come down to within a few hundred feet of Lake level in the dense forest.

During the severe winter of 1915-16 my wife and I noticed four Whiskey Jacks picking up crumbs near the house.

After the manner of their kind, they would feed undisturbed quite close to us from the beginning; but it was only after patient coaxing that we got the birds tame enough to perch and eat on our hands. By spring they were quite friendly and would swoop down from the tall trees in the vicinity whenever we held out a hand. Sometimes when we were working in the garden they would settle on one's head or shoulders.

If, perchance, they alighted on an empty hand, they would emphatically call for food by pecking at one's fingers most heartily.

Instead of going back to higher levels when the severe weather ceased, the Jays remained with us and nested at Lake level.

Both pairs brought their young to us when the latter could barely fly, and it was quite a surprise to see such sooty offspring.

The young birds came to our hands without any fear at first sight. They perched on our heads and shoulders, and covered us with bread and milk in a frantic endeavour to eat their first meal in the company of man.

In early autumn the young ceased to look like faded little Crows, and acquired the general white appearance of adult Oregon Jays.

Tame Whiskey Jacks, in numbers from four to twelve, have been with us since 1916, but, as none of these were ever banded, we have no means of knowing whether any of the original four are still with us.

We have tried the birds with all kinds of food and their undoubted favourite is cheese, of which they are passionately fond. (We had a tame Carrion Crow in England, and a morsel of cheese was always his favourite tit-bit.)

The Whiskey Jacks eat bread, porridge, uncooked rolled oats, cake, farinaceous food in general, and, of course, meat, raw or cooked. They have taken an occasional bite of apple or pear. Sometimes one will catch and eat an insect, but they will not look at an earth-worm. Fish, either raw or cooked, they dislike.

The birds each had their morning morsel of cheese to-day. They hold it in their mouths for a long time, turning it over and over with their tongues, as if the taste were most pleasing to them. The cheese is often shifted to the "pouch" under the chin and held there for some time. Then it may be deposited carefully on some safe perch, licked and mouthed again with intense satisfaction, then finally eaten. They do this with no other food.

In February the male makes very pretty love to his spouse. The latter sits on a nearby perch, ignoring any food that is thrown out. She flaps her wings in a coy way, after the manner of a nestling being fed by its mother, making plaintive little cries. The male bird scrambles for the most pleasing bit of food which is to be found, and gallantly carries it to his wife, who receives it in her beak and eats it with a great show of satisfaction.

On some balmy fragrant afternoon in the spring sunshine, when all the Whiskey Jacks are sitting in a row, contentedly fluffed out, may be heard their soft, lisping song, one to the other, most gentle and loving, like the notes of a company of Waxwings.

Vocally, our bird seems to be as versatile as the *Perisoreus canadensis* and is often fond of imitating the Pigmy Owl call.

On the approach of a Hawk, whose presence is usually detected by these birds from afar, they at once become perfectly motionless in the thickest part of a bush, uttering a low, plaintive, warning cry. When hard pressed, they will successfully fight off a Cooper's or a Sharp-shinned Hawk. After all these years on the Lake shore, they continue to take a Gull or a Heron for a Hawk, and display the same symptoms of fear.

Unlike some of our race, they have a passion for soap! We cannot leave a piece of soap outside the house for a short time without it being

carried off by the Jays. The camp soap suffers the same fate at 5000 ft. level in summer. When carrying anything beyond the capacity of their beaks, they use both feet with which to hold the object, the legs hanging straight down beneath the body as they fly.

As far as we have observed, these birds are a gentle, most loveable company, minding their own

business in bird-land, and never robbing a small bird's nest (of which there are always several nearby of Song Sparrow, Yellow-throat, etc.).

The Jays make free with our small garden, in which we find them admirable companions, respecting all our cherished alpine plants as well as salads, tomatoes, berries and the like.

AN EXPLORATION INTO THE NORTHERN PLAINS NORTH AND EAST OF GREAT SLAVE LAKE, INCLUDING THE SOURCE OF THE COPPERMINE RIVER

**By G. H. BLANCHET, F.R.G.S.
of the Topographical Survey of Canada**

(Continued from Page 16)

GEOLOGY, TOPOGRAPHY AND SOIL

No detailed study has been given to the geology of the interior country. It forms part of the great archaic plateau of Northern Canada, which is probably best known in the country north of Lake Superior.

It can be generalized as a subdued plateau, which was swept over by the ice fields of glacial times, when its soil and softer surface rocks were for the most part swept off. The harder rocks, chiefly pre-Cambrian, were ground down, rounded and polished, and over all, on the retreat of the ice by the melting back of its face, a mantle of drift was deposited. This was largely composed of sand, gravel and boulders. Since glacial times the action of the forces of nature has only slightly modified the surface of the country on account of the coarse nature of the materials and the short season it is released from frost.

The conditions found in the country become clear and logical in the light of its history. The great plains of irregularly deposited drift are features of much of the country, and through the thin cover the rounded and polished hills outcrop in some places, while in others the hills are formed of the drift material itself. The occurrences of sand mark episodes in the retreat of the glacier—its spillways and temporary lakes. The finer materials have usually been carried into the valleys and the lower country.

In the height of land district the rock formations are chiefly granites and gneisses outcropping in the hills, cut and overflowed by intrusives, and great areas of rocks of a schistose character in the valleys and often underlying the plains. The schists fracture, in weathering, into great slabs and the fracture plane is usually vertical, which facts are to a large extent accountable for the rugged appearance of the country. However, in spite of

the ragged appearance given to the valleys and plains by the low irregular ridges of the outcropping schist and the freakish disposition of the slabs weathered from them, these areas are usually well watered, contain fair soil and produce a good growth of grass.

It may be said that both the schist country and the intruded granites are favorable for the occurrence of minerals.

To the north and east from the height of land sedimentary rocks have been reported, the drift cover becomes heavier and of finer materials, and the country is more uniformly watered and there is consequently an improvement in the vegetation.

VEGETATION AND CLIMATE.

The vegetation of a country is determined by the soil, topography, and the prevailing climatic conditions. Where vegetation is struggling against adverse conditions the topography becomes an increasingly important factor in the shelter it affords, and also in providing places for the accumulation of the finer drift soil. This fact is clearly demonstrated in the case of a high mountain, and will be found to assist considerably in explaining the location of the line between the forests and the Barren Lands. Two questions present themselves in connection with the last woods. "Does the timber become gradually more stunted and more scattered till it disappears?" and "How final is the cessation of forest growth?" It is difficult to conceive of a line drawn across a plain on one side of which trees grow while on the other they cannot. However, such a line does exist, modified by variations of soil and shelter and the passage of this line remains an event of the trip of outstanding interest. It is true that on the forest side of the line areas of barrenness exist, but these are local; the great open stretches beyond normally

do not produce trees. Exceptions on this particular line of travel are so rare that they may be noted. At Thelon overland portage there are several clumps of scrub spruce a foot and a half high, at Musk Ox cascade on Casba River an ancient dwarf spruce and some high willows grow, and near the same point there are some clumps of the shrub type four feet high. These have all existed within the memory of the older Indians. There may be other similar occurrences of timber back from the waterways, but the line of the last woods may be taken as definitely established and maintained through the period during which knowledge of the country has existed.

Again, the nature of the trees at the last woods is found to be surprising. In sheltered spots, where protection is obtained from the winds, spruce and tamarack attain good development, but where exposed to the heavy driving winds from the northeast the spruce, which alone represents the forest, has been dwarfed and flattened against the ground in an almost unbelievable manner. Their hardihood is attested by the great age reached by these wind-blown dwarfs, exceeding 300 years in some cases, with the annual rings of growth almost microscopic and widest on the southwest side. It is probable that many seedlings engage in the war with the elements but few survive. The dwarfs of the hills and the well-developed trees of the sheltered valleys practically end together.

The situation at the last woods gives the clue by which the timber line is explained. Given the

climate and soil which obtain here, trees can develop only with a certain amount of shelter, and of the seedlings produced by them few survive in the open country and these only in a very stunted form. Back of the timber line rugged topography affords sufficient shelter to maintain the straggling forests, but beyond, the low hills, with their rounded outlines, offer no protection from the weather. This appears to be a satisfactory explanation for this part of the country, but should either of the factors assumed as constant, soil and climate, change, timber might reach development in spite of exposure to the winds. It is probable that isolated areas of timber beyond the normal timber line would be found to have modifying conditions; better soil, such as in the boulder clay areas, or climatic conditions locally tempered by low elevation or in some other way.

A traveller visiting the northern plains in late summer will carry away with him several impressions as to the color of vegetation. Of these only one will warrant the name so often applied to it of "barren". This effect is produced by the stretches of boulder moraines in which the predominating colours are the grey of the boulders and the black of the "tripe des roches", relieved only by the green of its swampy valleys. A more usual view is a pleasing one of gently undulating to moderately rolling country, well covered with shrubs and moss on the slopes and grass in the bottoms, coloring it a vivid green. A little later in the season, after the first frosts have come, a still



FIGURE 6.—BARREN LANDS CARIBOU AT HOME

The Caribou gives life to the somewhat monotonous plains of the North and in travelling in the country one finds himself most of the time watching a caribou or looking for one to appear.

more striking effect is produced by great splashes of crimson and yellow of the saxifrage, labrador tea, and blueberry bush.

The question of grass growth in these northern regions has been somewhat misrepresented. Any broad generalizations covering such a huge area will almost of necessity be unreliable. The reasonable supposition that grass will grow in this country where soil and moisture favour it will, I think, always be found to be the case. Coarse drift soil and exposed rocky country will not produce grass, while in the swampy bottom lands and on the lake margins certain grasses grow well. In the portion of the country traversed last season the occurrences of grass accorded absolutely with these conditions.

It was observed that the caribou held to the grassy valleys, and the Indians reported that they feed on grass and the leaves of the shrubs entirely in summer, eating the mosses and lichens only in winter. So assured were they of this that wherever the lichens were observed to have been disturbed they took it as a sign of the caribou having passed in winter. If it may be assumed that grass is largely their summer food, there must be large areas in their summer ranges on the lower steppes of the plateau where it is abundant. The muskoxen also are grass eaters, which further supports this argument. Another line of argument might be that if grass grows in any quantity in the area under observation, which may be considered one of the highest, most rugged, and poorest watered portions of the country, it would be reasonable to suppose that it would be more abundant where these conditions are modified.

A consideration of the vegetation brings up the question of fuel. Beyond the timber line nothing of firewood size grows, except a very small willow, which is found along the water's edge in certain places. While this, and a form of coarse black moss, which grows on the rock ridges, offer a precarious supply for a small party travelling rapidly through the country, it is not advisable to depend on them, as they make the fuel question too much of a controlling factor and hamper operations. Travel and work here would be much simplified by carrying some form of oil fuel.

The climate in this portion of the country has been largely determined by the fact that the prevailing winds are from the northeast, blowing without obstruction from Hudson Bay and the Arctic. Add to this the long winter and the continuous daylight of its summer season, due to its latitude, and exaggerated extremes are to be expected.

If the effects of the winds are ignored, the season might be described as a short but intense

growing season including June, July and August, a brief autumn merging into winter about the beginning of October, a cold winter with comparatively little snow, and spring starting in March. The winds, however, complicate each season, intensifying the winter and bringing unseasonable weather into each of the other seasons. Due to the cold winter and the light snowfall, ice forms to a great thickness on the lakes, and, unless there is the lifting action of considerable spring waters, the break-up may be late in July. In this connection it is interesting to note that during the past season the water level of Great Slave Lake was nearly two feet higher than normal, while the rivers flowing into it from the south were not high and the southern lakes were exceptionally low. The explanation of this, that conditions of unusually high water existed in the Barren Lands in the spring, was verified by observations made on the trip. On all the lake's visited evidences of great spring floods were noted, and even in the late summer grass and shrubs along the margins were flooded.

THE FAUNA OF THE NORTHERN PLAINS

The fauna of the Northern Plains is to a large extent peculiar to it. First in importance is the species of caribou, known as the Barren Ground Caribou, (*Rangifer arcticus*). It has always been one of the most important factors of life and travel in this portion of the country. When caribou were obtained, food was abundant and their skins supplied clothing and leather; "no caribou" was almost synonymous with starvation. Consequently, their movements and habits have been anxiously studied. But the caribou is a migratory animal, and the people in the various parts of its great range have little or no contact with one another, so it is necessary to piece together the fragmentary accounts of the people living in the various parts of its range in order to have a clear idea of its wanderings.

Like all migratory species, it responds to two main instincts—to obtain less rigorous winter conditions and to produce its young in a favored locality. The working of these two instincts has given the caribou of the sub-Arctic regions the greatest range of any land animal. In fact, its life is almost entirely occupied in migrations, backward and forward between the timber in the south where it winters and the coast and islands of the Arctic, where its young are born. The bulls and the cows seldom travel together, which further complicates the study of their movements.

Piecing together the various accounts and observations, the story of the caribou is somewhat as follows. The cows, with the young of the previous season, leave the shelter of the woods



FIGURE 7.—THE EDGE OF THE WOODS, LAKE MACKAY

Wherever the edge of the forest was observed, it was found the last stragglers occurred in the valleys of rough, broken country, proving that the factor of "shelter" is a very important one.

some time in February and work their way northward, travelling in large bands, with the objective of reaching the Arctic coast for the calving season in June. They follow routes that take advantage of lake crossings that may be made on the ice, thereby avoiding rough country. Another very important consideration determining their travel at this season of the year is that their food is almost entirely the lichens which grow on the hills. The winter and spring trails will usually be found to be more direct, and, though they are deeply worn, the moss is not usually broken, as they are travelled at a time when the frost is still in the ground.

The bulls do not leave the woods till much later, and travel northward more slowly, following the retreating snow. As the season advances, they lose their herding instinct and scatter widely throughout the Barren Lands. Their horns are discarded in December, and their life in the spring and summer is a leisurely one, as they search for the best supply of food—moss, grass and later the leaves of the small willows and the scrub black birch. The fly season in the Barren Lands includes late June, July and early August and, in order to avoid this torment, the caribou have only one resource—to travel against the wind. Their gait is a swift trot and their feeding at this time consists of a series of snatches. This swift travel and the varying winds of summer account partly for the wide and erratic travel of the sum-

mer season. It is probable that very few of the old bulls reach the Arctic coast.

The heavy storms of early August start the southerly migration of the cows, the yearlings and the young. Their food at this season is chiefly grass and leaves, and the good summer feeding grounds are differently situated from their winter and spring ranges, the former being found in the wide low valleys and the latter chiefly on the hills. Consequently the southerly migrations, seeking country of this nature and avoiding wide crossings of the lakes, take different routes from those of the spring.

The last of the heavy greyish winter coat should be shed before the end of July, and they become a sleek brown, with white on the neck and chest of the bulls and on the belly and rump of the cows. Their wonderful horn growth begins in the spring and matures in September. The Barren Lands caribou bull is transformed by his horns from a small, rather insignificant animal to one with an imposing presence in repose and of striking appearance in animation.

Late August and September is the easy time of the caribou year cycle, food is abundant, the flies disappearing and the weather not severe. They are travelling in bands of varying size with little cohesion, and may be observed to break and reform when meeting other bands. While the general drift towards the woods is maintained, it is erratic. Pauses are made in good feeding

grounds, and there is a certain amount of aimless wandering. As the bands move southward they meet the bulls in their summer range, and a few old bulls will usually be found with each band, leading the way when travelling and mounting guard when resting and feeding.

The caribou have remarkable sight, hearing and scent. They are almost impossible to approach in open country without detection; in fact, in order to do so it is necessary to play on their curiosity, which will only be successful till they get the human scent, when they are off in the wildest panic. When disturbed near water their instinct is to take to the water and they are capable of swimming incredible distances. In the interior they generally make for a hill top.

It is in September that the Indians who live outside the caribou range journey to meet them. The skins are prime at this time, those of the bulls for leather and those of the cows and calves for winter clothing. They also put up dry meat, seeking the old bulls, who have most fat at this season.

October sees the final massing of the herds and the advance of the "foule" towards the woods. This is a sight seldom seen by white men, when for days continuous bands pass a given point and when estimates can be made only in acres or square miles. The country east and north of Great Slave Lake includes part of one of the great trunk lines of the migration. It is probable that most of the caribou ranging the country between Great Bear Lake and Backs River gather into the route deflected around the east end of the lake and many winter there; for that reason it makes an excellent point for observation and for experimental work toward protection and domestication.

The musk-ox (*Ovibos moschatus*), even more than the caribou, is a species distinctive of the northern plains. It is to be feared that the musk-oxen are approaching extinction. In the past their greatest enemy was the wolf, and in order to meet this danger they adopted certain tactics which later contributed to their destruction. At the approach of danger they halted and formed a circle, heads outwards. This kept the wolves at bay. The Indians and Eskimos took advantage of this custom when hunting them, sending their dogs in advance to halt and hold the herds together. They would then come with their rifles and easily exterminate the band. It is many years since the Great Slave Lake Indians hunted the musk-ox, but the old men still remember the hunts, which entailed great hardships and offered little profit, as the trip was of necessity a dash made under the severe conditions of winter far from the woods. Two routes were followed, one leaving Great Slave Lake at Talthelei (the former Fond du Lac post) and striking northward, by which

they crossed Mackay Lake at the last woods and would meet the musk-ox on the upper Coppermine. The other route brought them to Thelon River and the upper lakes. Both these routes carried them to the hunting grounds of the Eskimos from the Arctic and Hudson Bay, who also hunted the musk-ox. The latter has been saved from extinction by the fact that both the Indians of the interior and the Eskimos of the coasts have in the last forty years shortened their hunting expeditions and there is now an area of country, including the headwaters of Coppermine, Backs and Thelon Rivers, where they probably survive unmolested.

Fresh signs were observed at one point last season on Clinton-Colden Lake, but, though ridges were investigated which were reported by the Indians to have been frequented formerly by musk-oxen, no other tracks were seen.

The only other large animal native to this country is the Barren Grounds grizzly, (*Ursus richardsoni*), or, as the Indians speak of it, the white bear. It is not numerous, but it may be traced by the places where it has been digging for ground squirrels and its great strength is evidenced by the boulders pulled out.

The wolverines (*Gulo luscus*) are of interest chiefly on account of their destructiveness. It is almost impossible to protect a cache from them, as they can climb and dig and have great strength.

The Arctic hare (*Lepus arcticus canus*) was fairly abundant in the district traversed. The hares are looked on as a reserve food supply by both the natives and the wolves and foxes. They keep to the stony hills.

The wolves and foxes are at present receiving considerable attention in the country east of Great Slave Lake, the wolves (*Canis tundrae*) as a conservation measure in protecting the caribou and the white foxes (*Alopex lagopus*) on account of the increasing value of their pelts. Both these animals in adapting themselves to their habitat have developed qualities peculiar to this part of the country. Both have the protective whiteness given to most animals of the Barren Lands; in their case to assist them when hunting. The white wolf remains white in summer, while the fox turns to a peculiar mixture of dark colours, best described as a brindle. The wolf usually dens and produces its young near the edge of the forest, while the fox rears his far out on the plains. Both subsist mainly off the caribou, and at all seasons may be found in the vicinity of the herds. The Indians claim that the wolf can kill almost at will, and there is no doubt he takes a heavy toll; evidence of his kills are seen in all directions. The foxes follow the wolves and clean up what they leave.

(To be concluded.)

PROSECUTIONS—MIGRATORY BIRDS CONVENTION ACT

BY OFFICERS OF THE CANADIAN NATIONAL PARKS AND ROYAL CANADIAN MOUNTED POLICE.

Reported during the period January 18, 1924, to November 13, 1924

GOULDING, G. C., Oyama, B.C. Having in possession a Loon in the closed season. Charge withdrawn. Forfeitures: One mounted Loon.

RYAN, J., Glenn Valley, B.C. Killing a Swan. Fine: \$10.00.

WILLIS, J. W., Port Mouton, Queens Co., N.S. Attempting to kill Black Ducks in close season. Case dismissed.

SIDENER, James, South Ferraby, Alberta. Having in possession portions of protected birds in close season—skins of three Loons. Fine: \$10.00.

BECKER, Herman W., Riverside, Essex Co., Ont. Violation of Section (2), possessing Duck, and decoys out in close season. Forfeitures: One wild Duck, one pump gun, ammunition and three decoys. Fine: \$10.00.

COSSABOON, Allen, Grand Harbor, Grand Manan, N.B. Hunting wild Ducks in close season. Sentence suspended.

WOOSTER, Albert, Grand Harbor, Grand Manan, N.B. Hunting wild Ducks in close season. Sentence suspended.

MITTON, E. Roy, Baie Verte, N.B. Hunting Geese and Brant in close season. Case dismissed.

MELOCHE, Raymond, Anderton Tp., Essex Co., Ont. Hunting wild Ducks in close season. Forfeitures: 43 decoys. Fine: \$20.00.

MELOCHE, Ernest, Anderton Tp., Essex Co., Ont. Hunting wild Ducks in close season. Fine: \$20.00.

CUNNINGHAM, Rudolph, Cape Sable Island, Shelburne Co., N.S. Having in possession migratory game birds in close season—Eider Duck. Forfeitures: One dead Duck. Fine: \$25.00.

CUNNINGHAM, Eugene, Cape Sable Island, Shelburne Co., N.S. Having in possession migratory game birds in close season—Eider Duck. Fine: \$25.00.

FAULKNER, Robert, Ostrea Lake, Halifax Co., N.S. Hunting wild Ducks in close season. Fine: \$10.00.

MOSHER, Stephen E., Ostrea Lake, Halifax Co., N.S. Hunting wild Ducks in close season. Fine: \$10.00.

MOSHER, John S., Ostrea Lake, Halifax Co., N.S. Hunting wild Ducks in close season. Fine: \$10.00.

MOSHER, Wm., Ostrea Lake, Halifax Co., N.S. Hunting wild Ducks in close season. Fine: \$10.00.

KENT, Archibald, Pleasant Point, Halifax Co., N.S. Having in possession wild Ducks in close

season. Forfeitures: One single barrelled shot-gun and bag of ammunition. Fine: \$10.00.

KENT, Archibald, Pleasant Point, Halifax Co., N.S. Hunting wild Ducks in close season. Fine: \$10.00.

YOUNG, Vincent, Ostrea Lake, Halifax Co., N.S. Having in possession wild Ducks in close season. Fine: \$10.00.

YOUNG, Vincent, Ostrea Lake, Halifax Co., N.S. Hunting wild Ducks in close season. Forfeitures: One double barrelled shot-gun and bag of ammunition. Fine \$10.00.

BOWSER, Isaac, Ostrea Lake, Halifax Co., N.S. Hunting wild Ducks in close season. Forfeitures: One double barrelled shot-gun and bag of ammunition. Fine \$10.00.

BOWSER, Isaac, Ostrea Lake, Halifax Co., N.S. Having in possession wild Ducks in close season. Fine: \$10.00.

BOWSER, Reuben, Ostrea Lake, Halifax Co., N.S. Having in possession a wild Duck in close season. Fine: \$10.00.

WILLIAMS, James, Ostrea Lake, Halifax Co., N.S. Having in possession wild Ducks in close season. Fine: \$10.00.

WILLIAMS, James, Ostrea Lake, Halifax Co., N.S. Exceeding the bag limit. Case dismissed.

WILLIAMS, James, Ostrea Lake, Halifax Co., N.S. Hunting wild Ducks in close season. Forfeitures: One double barrelled shot-gun and bag of ammunition. Fine: \$10.00.

WILLIAMS, Leonard, Ostrea Lake, Halifax Co., N.S. Having in possession wild Ducks in close season. Fine: \$10.00.

WILLIAMS, Leonard, Ostrea Lake, Halifax Co., N.S. Hunting wild Ducks in close season. Forfeitures: One double barrelled shot-gun and bag of ammunition. Fine: \$10.00.

LEVY, Amos, Cross Island, Lunenburg Co., N.S. Having in possession portions of wild Ducks in close season. Fine: \$10.00.

MASSON, Damas, Onion Lake, Sask. Having in possession portions of a Loon. Fine: \$10.00.

DOBSON, Arthur R., Cape Tormentine, N.B. Hunting wild Geese and Brant in close season. Fine: \$20.00.

MILLS, Cecil, Mills Point, P.E.I. Hunting Canada Geese in close season. Fine: \$10.00.

MILLS, Walter, Mills Point, P.E.I. Hunting Canada Geese in close season. Fine: \$10.00.

KELLY, Thomas, Mills Point, P.E.I. Hunting Canada Geese in close season. Fine: \$10.00.

CHAPPELL, John, Mills Point, P.E.I. Hunting Canada Geese in close season. Fine: \$10.00.

DRISCOLL, Brenden, Mills Point, P.E.I. Hunting Canada Geese in close season. Fine: \$10.00.

MILLS, Harold, Mills Point, P.E.I. Having in possession Canada Geese during close season. Forfeiture: One Canada Goose. Fine: \$10.00.

MILLS, Ernest, Mills Point, P.E.I. Having in possession three Canada Geese in close season. Forfeitures: Three Canada Geese. Fine: \$10.00.

POIRIER, Thaddius, Cape Egmont, P.E.I. Having in possession portions of Mergansers which were taken in close season. Forfeitures: Three glass sealers of meat—Merganser. Sentence suspended.

POIRIER, Thaddius, Cape Egmont, P.E.I. Having in possession Canada Geese in close season. Sentence suspended.

STANLEY, Austin, 50 King St., Charlottetown, P.E.I. Hunting Black Ducks in close season. Fine: \$10.00.

TAYLOR, James, St. Peter's Island, P.E.I. Having in possession Brant in close season. Forfeitures: Gun and Brant. Sentence suspended.

TAYLOR, James, St. Peter's Island, P.E.I. Hunting Brant in close season. Sentence suspended.

COSSABOON, Albert, White Head, Grand Manan, N.B. Having in possession Gulls' eggs. Forfeitures: Five eggs. Fine: \$10.00.

COSSABOON, Ross, White Head, Grand Manan, N.B. Having in possession Gulls' eggs. Forfeitures: Five eggs. Fine: \$10.00.

JUVENILE, Truro, N.S. Molesting and destroying the nest and young of a migratory insectivorous bird—a Flicker. Sentence suspended.

JUVENILE, Truro, N.S. Molesting and destroying the nest and young of a migratory insectivorous bird—a Flicker. Sentence suspended.

RICHARD, Adelard, Esquimaux Point (Havre St. Pierre), P.Q. Having in possession one egg of a Herring Gull. Fine: \$10.00.

MAUGER, Thomas, Whale Head, Saguenay Co., P.Q. Having in possession eggs of Common Murres and Razor-billed Auks. Forfeitures: 593 eggs of Common Murres and Razor-billed Auks. Fine: \$15.00.

MAUGER, Ernest, Point au Maurier, Saguenay Co., P.Q. Taking eggs of common Murres and Razor-billed Auks. Fine: \$10.00.

MAUGER, Ernest, Point au Maurier, Saguenay Co., P.Q. Furnishing false information to a game officer. Fine: \$10.00.

DAUPHINEE, Harvey, Glen Haven, Halifax Co., N.S. Molesting Canada Geese in close season. Fine: \$20.00.

GREGOIRE, Michel, Romaine, P.Q. Having in possession Eider Ducks. Forfeiture: One shotgun. Sentence suspended.

CARTOUCHE, Pierre, Romaine, P.Q. Having in possession Eider Ducks. Forfeiture: One shotgun. Sentence suspended.

DAOULT, A. S., Val Tetreau, P.Q. Shooting wild Ducks in close season. One month in jail, sentence suspended upon defendant furnishing bond in sum \$100.00 and being bound over to keep the Migratory Bird Law for one year. Forfeitures: Two Ducks.

SMITH, Walter, Lourdes de Blanc Sablon, Saguenay Co., P.Q. Possession of migratory non-game birds—seven Puffins. Sentence suspended.

BUCKLE, Isaac, Lourdes de Blanc Sablon, P.Q. Having in possession migratory non-game birds—seven Puffins. Sentence suspended.

DU BOIS, Art., Seven Islands, P.Q. Killing a Herring Gull. Forfeitures: One Herring Gull. Sentence suspended.

THERIAULT, Edgar, Esquimaux Point, P.Q. Having had in his possession five Great Black-backed Gulls. Fine: \$10.00.

INGERSOLL, Earl, Grand Harbor, Grand Manan, N.B. Killing a Herring Gull. Sentence suspended.

LA FOLLEY, Edward, Seal Cove, Grand Manan, N.B. Hunting Canada Geese in close season. Sentence suspended.

MCDONALD, Alexander, Covedell, Northumberland Co., N.B. Hunting Black Ducks in close season. Fine: \$25.00.

MCEACHERN, John, Covedell, Northumberland Co., N.B. Hunting Black Ducks in close season. Fine: \$25.00.

GRATTON, Fred, Covedell, Northumberland Co., N.B. Hunting Black Ducks in close season. Fine: \$25.00.

CURRIE, Paul, Fredericton, N.B. Killing a Black Duck in close season. Fine: \$10.00.

PRITCHARD, Valentine, Lakeside, N.B. Having in possession three Spotted Sandpipers. Forfeitures: Three Spotted Sandpipers. Sentence suspended.

PRITCHARD, Valentine, Lakeside, N.B. Hunting Spotted Sandpipers. Fine: \$10.00.

POIRIER, Prosper, Mizonette, Gloucester Co., N.B. Hunting Black Ducks in close season. Fine: \$10.00.

GRAVES, George, Lower Canard, N.S. Hunting Black Ducks in close season. Forfeitures: One gun. Fine: \$10.00.

CANVIN, James, New York, U.S.A. Killing one or more Semi-palmated Sandpipers. Forfeitures: Several Sandpipers. Fine: \$10.00.

FURTHER NOTES ON THE ORCHIDS, FERNS AND BUTTERFLIES OF HATLEY, STANSTEAD COUNTY, QUEBEC, 1924

By HENRY MOUSLEY

IN PREVIOUS years, I have generally treated the orchids, ferns, and butterflies separately, but having done very little work on the two last during the past year (1924), I have thought it best to incorporate all three in one paper. If, as I remarked in the April number of *The Canadian Field-Naturalist* for 1924, the spring of 1923 was a disappointing one, what can be said of the present one, which was even worse, if anything, not only as regards the lateness of the blooming of the wild flowers, but also of the arrival of the birds from their winter quarters. I have added no new species of orchids to my list, nor yet ferns, but, nevertheless, the season cannot be said to have been an entire blank, as several new wild flowers have been met with, as well as many new stations for some of the orchids. This latter fact has been as interesting to me, almost, as actually finding new species, as it has given me a still better idea of the distribution of some species, which, hitherto, I had found only in very limited numbers. In the early part of the spring, I devoted most of my time to the further elucidation of the underground development of the Hooded and Nodding Ladies' Tresses (*Spiranthes Romanzoffiana* and *S. cernua*), the former of which I touched upon in my previous paper, *Canadian Field-Naturalist*, Vol. XXXVIII, 1924, No. 4, p. 62, intimating that the subject would no doubt be fully dealt with in the *Orchid Review*, which has since been done, in the March, October, and November numbers of the present year (1924), the latter number also containing an account of the fertilization of *S. Romanzoffiana*—by the small bee *Chloralictus smilacini* Rob.—a thing hitherto unknown. The lovely little Calypso, I am pleased to say, was found growing in two new stations, but these were only small ones, in one case consisting of nine, and in the other of five plants only, one of which, however, bore a snow-white bloom, an unusual thing in Calypso. As regards its underground development, I imagined I had fully described this in the *Journal of the New York Botanical Garden*, Vol. XXV, 1924, pp. 25-30, but so many new facts have come to my notice during the present season that it has necessitated another paper, which will no doubt appear later on in *Torrey*, or in the *Bulletin of the Torrey Botanical Club*. I am afraid the introduced Small White Lady's Slipper (*Cypripedium passerinum*)—although doing so well last year—is now dying out, only two plants out of the five appearing this year, which were very small and bore no blooms. Of

the three other introduced species, *Serapias Helleborine* or the Broad-leaved Epipactis—now known as *Amesia latifolia*—I am afraid is dead, whilst the two others, the Crane-fly Orchis (*Tipularia discolor*), and the Putty-root (*Aplectrum hyemale*), did not bloom at all, but they were preparing to send up new leaf buds when I left Hatley to spend the winter in Montreal, towards the end of September. The rare little Ram's Head Lady's Slipper (*Cypripedium arietinum*) again evaded all my efforts to locate it, and I am beginning to think it is not to be found in the immediate vicinity of Hatley. I visited only once the great swamp at Beebe, on June 28, in company with Mr. C. H. Knowlton, when two interesting plants were found, one, the Swamp Fly Honey-suckle (*Lonicera oblongifolia*), and the other, the One-flowered Cancer-root (*Orobanche uniflora*), a curious little parasitic plant, which, if I remember rightly, was growing on the roots of the Red-osier Dogwood (*Cornus stolonifera*). Both these plants were new to my list. Amongst other interesting things, several white examples of the Moccasin Flower (*Cypripedium acaule*) were found, one being an exceptionally fine specimen, measuring 40 cm. in height, thus exceeding the extreme given in Gray's *Manual* by 2 cm. On July 21, I visited Lake Park, Quebec, where Mr. Knowlton had found a small colony of the Downy Rattlesnake Plantain (*Epipactis pubescens*) in 1923—as previously reported—but I failed unfortunately to locate the exact spot, finding only the so-called Loddige's Rattlesnake Plantain (*Epipactis tessellata*)—in which I have not much faith—and a few other common species. Until the present season, I had found the Slender Ladies' Tresses (*Spiranthes gracilis*) only in three stations, and in two of these only one plant had been found, but now these stations have been increased to seven, the largest containing twenty-seven plants, all in bloom. The Early Coral Root (*Corallorrhiza trifida*) is another orchid which, although very generally distributed, had not many plants in the stations found previously, but I was fortunate in finding a new one this season, on July 23, which contained eighty-four plants in fruit. The Large Coral Root (*C. maculata*) is another species which has interested me very much this season, owing to the fact of my having found a new colony, containing quite a different colour phase of the plant, i.e., a beautiful pink, probably the var. *punicea*, instead of the usual brown one, var. *intermedia*, which I have hitherto found to be the prevailing

colour here. It has been said that to him who waits all things come in time; certainly I have waited a long time before finding the Ragged Fringed Orchis (*Habenaria lacera*) at Hatley, but it has come at last, for I found the species—one plant only—growing within two miles of the village on July 31. It was indeed a red letter day, only one other example having been found, and that on July 29, 1922, in the great swamp at Beebe, Quebec, which is fifteen miles from Hatley, as the crow flies. This find well illustrates the ironies of orchid hunting, for only last year I had worked very carefully over this ground, when looking for the var. *ochroleuca* of *Spiranthes cernua*—in fact had taken a photograph of the site, which actually included the very tree under which *H. lacera* was eventually found—but this was on September 7, when *lacera* would hardly be recognizable, although in a very exposed position. Can it once have been plentiful here and hybridized with the Small Purple Fringed Orchis (*H. psycodes*), and since died out? Certainly, I find quite a large number of white examples of the latter every season, far in excess of what one might expect, seeing that none of the text books even mention the fact of white blooms ever occurring in this species, although we all know that magenta-coloured flowers are subject to this change occasionally, as in *Arethusa*, *Calopogon*, and *Calypso*, etc., but it is usually not of common occurrence. However, my white forms are not typical \times *H. Andrewsii*, although some of the labellums are certainly not typical *H. psycodes*, and at that I leave it. Although, as I have previously mentioned, the Broad-leaved Epipactis (*Amesia latifolia*) did not survive its removal from Toronto, and transplanting at Hatley, still I had the satisfaction of seeing it growing in its natural surroundings on Mount Royal, on my arrival in Montreal, towards the end of September. There I found it growing all over the mountain, in some cases as many as 150 plants in a very small area, some of which exceeded 80 cm. in height, the tallest being 89 cm., which is 29 cm. in excess of the maximum height given in Gray's *Manual*! The raceme of this latter was 26.5 cm. in length, and bore 77 dehiscent capsules, but another much smaller plant actually had 54 capsules on a raceme only 15 cm. long! The plants were invariably found growing under the shade of trees, and very often in quite stony ground. Naturally, I am looking forward to next year, when I hope to see it at flowering time and make an exhaustive study of all its other interesting peculiarities, which are many but which, so far as I know, have not yet been critically examined or reported upon in this country.

Of the ferns I can say very little, having paid but cursory attention to them this year; still, I

found two rare things that many a collector does not meet with in a life time, i.e., a plant of the Rattlesnake Fern (*Botrychium virginianum*) with four fruiting panicles, and one of the form *onodagense* of the Moonwort (*Botrychium Lunaria*), which—apparently—is a case of true dichotomous branching, i.e., the stem divides or forks into two branches, each of which bears a fertile and a sterile frond, a thing quite rare in the Botrychiums. Beyond this, which I suppose would satisfy most collectors, I have nothing remarkable to add except that I received a thrill one morning on opening a parcel from the National Herbarium of Canada, to find that it contained a few lovely specimens of the rare little Dense Cliff Brake (*Cryptogramma densa*)—or, as some prefer to call it, *Pellaea densa*—collected in 1921 by Mr. Robert Harvie, Ottawa, near Black Lake, Megantic County, Quebec, only the second station known for it in the Province of Quebec, the other being Mt. Albert in the Gaspé Peninsula.

As regards the butterflies, I practically drew a blank, nothing unusual being found. The Monarch (*Danaus archippus*) was very scarce, after being so plentiful last year, only a very few specimens being seen, and no larvae found. I came across just one example of the Acadian Hairstreak (*Strymon acadica*), which I have not seen since 1921, and then only one example was met with. The rare little Arctic Skipper (*Carterocephalus palaemon*) was seen in perfect condition in the big swamp at Beebe, which I visited on June 28 in company with Mr. C. H. Knowlton, as already mentioned. Perhaps the only outstanding feature of the season was the comparative abundance of the Pearly Eye (*Enodia portlandia*), and the Painted Lady (*Vanessa cardui*). Of the former, which is a scarce butterfly here, I saw eight examples, which is more than double what I generally meet with, and of the latter, which I have not seen for three years, I saw five examples, besides finding many larvae feeding on thistles, which I collected and reared, most of which, however, were unfortunately ichneumonized, so that the results were very few imagos, the last—a fine one—emerging on October 8. Like the Monarch, the Painted Lady is a great migrant, its proper home probably being northern Africa, where at times it becomes so numerous that emigration no doubt becomes a necessity, almost any part of the world becoming the dumping-ground of this surplus stock. Of the smaller Fritillaries, I cannot help noticing the growing scarcity of the Baltimore (*Euphydryas phaeton*), which, like Harris' Checker-spot (*Melitæa harrisi*), is becoming extinct in the places where I have hitherto been accustomed to find them. It is now three years since I have seen either of them.

Before closing, I would like to say that the birds have not been entirely forgotten, especially the Warblers, in fact, the intensive study of their home-life swallows up no end of my time, and many things go by the board in consequence. As a further contribution to my paper on this subject in *The Auk*, Vol. XLI, 1924, No. 2, pp.

OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS*

(Continued from page 19)

COMMON MURRE, No. 204,727, downy young, banded by Harrison F. Lewis, on a small island near Cove Island, between Pointe au Maurier and Harrington, Saguenay County, Quebec, (Canadian Labrador), on August 12, 1923, was shot at a place three miles south-east of Swain's Island, situated on the north side of Bonavista Bay, Newfoundland, on June 2, 1924.

GLAUCOUS-WINGED GULL, No. 232,821, nestling, banded by Theed Pearse, at Mittlenach, Gulf of Georgia, British Columbia, on August 12, 1923, was killed at "Hama Hama Boom" on Hood's Canal, Washington—no date given, but reported on April 25, 1924.

HERRING GULL, No. 204,694, fledgling, banded by Harrison F. Lewis, on a small island near Cove Island, between Pointe au Maurier and Harrington, Saguenay County, Quebec, (Canadian Labrador), on August 12, 1923, was shot near Aspey Cove, Fogo District, Newfoundland, on September 19, 1924.

HERRING GULL, No. 204,762, partly fledged young, banded by Harrison F. Lewis, on a small island near Cove Island, between Pointe au Maurier and Harrington, Saguenay County, Quebec, (Canadian Labrador), on August 12, 1923, was captured in a fox trap, at Pointe aux Esquimaux, Quebec, (180 miles south and west of the place where the bird was banded), on October 13, 1923.

RING-BILLED GULL, No. 210,471, partly fledged young, banded by Harrison F. Lewis, at Pointe au Maurier, Saguenay County, Quebec, (Canadian Labrador), on August 12, 1923, was taken at Red Point near Domino Run, Labrador, on the north-east coast and 100 miles north of Belle Isle, on September 14, 1923.

RING-BILLED GULL, No. 210,488, partly fledged young, banded by Harrison F. Lewis, at Pointe au Maurier, Saguenay County, Quebec, (Canadian Labrador), on August 12, 1923, was picked up on the beach at Hull, Massachusetts, on October 2, 1923.

DOUBLE-CRESTED CORMORANT, No. 232,122, young, banded by Reuben Lloyd, at Last Mountain Lake, Saskatchewan, on July 1, 1923, was killed at Long Lake, Saskatchewan, on September 15, 1924.

MALLARD, No. 101,873, male, banded by L. V. Walton, at Cuivre Island, Missouri, on January 14, 1923, was shot near Viscount, Saskatchewan, about September 20, 1924.

MALLARD, No. 203,747, female, banded by John Broeker, at Portage des Sioux, Missouri, on April 1, 1923, was shot on the Owl River, which empties into Lac la Biche, Alberta, in Tp. 68,

*Published by authority of the Canadian National Parks Branch, Department of the Interior, Canada.

263-88, I have this year added a further study of the Northern Parula, as well as one of the Yellow Warbler, and Ovenbird, the two last being especially interesting, perhaps the most interesting I have so far made, the publication of which will no doubt take place later on.

Rge. 13, W. 4th M., shortly before September 23, 1924.

MALLARD, No. 232,003, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 12, 1923, was killed at Davidson, Saskatchewan, on October 17, 1923.

MALLARD, No. 232,083, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 12, 1923, was killed on the Little River, Grant Parish, Louisiana, on January 5, 1924.

MALLARD, No. 232,093, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 12, 1923, was killed at Lake Arthur, Louisiana, on December 19, 1923.

MALLARD, No. 232,097, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 12, 1923, was shot at Little Lake, Louisiana, on December 2, 1923.

MALLARD, No. 232,107, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 12, 1923, was killed at Davidson, Saskatchewan, on October 28, 1923.

MALLARD, No. 232,123, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 12, 1923, was killed at Liberty, Missouri, on November 6, 1923.

MALLARD, No. 232,147, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 12, 1923, was killed at Towner, North Dakota, on September 28, 1923.

MALLARD, No. 202,579, banded by H. S. Osler, at Lake Scugog, Ontario, on August 24, 1923, was shot at Lake Scugog, Ontario, during the week of September 4, 1923.

MALLARD, No. 202,582, banded by H. S. Osler, at Lake Scugog, Ontario, on August 25, 1923, was shot about two miles from Caesarea, Ontario, on Lake Scugog, on October 18, 1923.

BLACK DUCK, No. 203,467, banded by John Broeker, at Portage des Sioux, Missouri, on February 8, 1923, was killed on the Severn River, Hudson's Bay, Ontario, on June 24, 1924.

BLACK DUCK, No. 202,541, banded by H. S. Osler, at Lake Scugog, Ontario, on August 24, 1923, was shot at Oakfield, New York, on October 25, 1923.

BLACK DUCK, No. 202,544, banded by H. S. Osler, at Lake Scugog, Ontario, on August 24, 1923, was shot at Port Clinton, Ohio, on November 6, 1923.

BLACK DUCK, No. 202,545, banded by H. S. Osler, at Lake Scugog, Ontario, on August 24, 1923, was shot at Rotten Lake, north of Norwood, Ontario, on September 3, 1923.

BLACK DUCK, No. 202,558, banded by H. S. Osler, at Lake Scugog, Ontario, on August 24, 1923, was killed at Paul's Channel, Broadwater Bay, Machipongo, Virginia, on November 24, 1923.

BLACK DUCK, No. 202,560, banded by H. S. Osler, at Lake Scugog, Ontario, on August 24, 1923, was shot in Hay Bay, Bay of Quinte, Lennox and Addington County, Ontario, on October 8, 1923.

BLACK DUCK, No. 202,561, banded by H. S. Osler, at Lake Scugog, Ontario, on August 24, 1923, was shot at Cardinal, Ontario, on September 22, 1923.

BLACK DUCK, No. 202,590, banded by H. S. Osler, at Lake Scugog, Ontario, on August 25, 1923, was shot on Cranberry Bay, at the north-west end of Cameron Lake, Victoria County, Ontario, on September 1, 1923.

BLACK DUCK, No. 202,606, banded by H. S. Osler, at Lake Scugog, Ontario, on August 27, 1923, was shot at Brown Hill, Ontario, on October 18, 1923.

BLACK DUCK, No. 202,608, banded by H. S. Osler, at Lake Scugog, Ontario, on August 27, 1923, was killed on Cross Lake, Onondaga County, New York, on December 29, 1923.

BLACK DUCK, No. 202,609, banded by H. S. Osler, at Lake Scugog, Ontario, on August 27, 1923, was killed at Santee, South Carolina, on January 8, 1924.

BLACK DUCK, No. 202,613, banded by H. S. Osler, at Lake Scugog, Ontario, on August 27, 1923, was killed near Oak Grove, Virginia, on December 25, 1923.

BLACK DUCK, No. 202,614, banded by H. S. Osler, at Lake Scugog, Ontario, on August 27, 1923, was killed in Quitman County, Mississippi, about 10 miles east of Marks, Mississippi, on January 8, 1924.

BLACK DUCK, No. 202,623, banded by H. S. Osler, at Lake Scugog, Ontario, on August 28, 1923, was found dead in a trap, in a shallow marsh about 7 miles west of Algonquin Park, near Ravensworth, Ontario, on May 2, 1924.

BLACK DUCK, No. 202,625, banded by H. S. Osler, at Lake Scugog, Ontario, on August 28, 1923, was shot at Whitby, Ontario, on September 1, 1923.

BLACK DUCK, No. 202,637, banded by H. S. Osler, at Lake Scugog, Ontario, on August 29, 1923, was shot on a small marsh pond near Ingersoll, Ontario, on September 8, 1923.

BLACK DUCK, No. 202,638, banded by H. S. Osler, at Lake Scugog, Ontario, on August 29, 1923, was shot at Long Point, Ontario, 10 miles from the border, on September 22, 1923.

BLACK DUCK, No. 202,639, banded by H. S. Osler, at Lake Scugog, Ontario, on August 29, 1923, was killed at Saluda, Virginia, on November 19, 1923.

BLACK DUCK, No. 202,652, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was killed at Broadwater Bay, Virginia, on December 24, 1923.

BLACK DUCK, No. 202,660, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was killed in Salem Cove, at Salem, New Jersey—no date given, but reported on October 13, 1923.

BLACK DUCK, No. 202,662, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was shot about 4 miles south of Belleville, Ontario, on November 24, 1923.

BLACK DUCK, No. 202,664, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31,

1923, was killed at Onancock, Virginia, on January 15, 1924.

BLACK DUCK, No. 202,668, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was shot at the Big Point Club, on Lake St. Clair, Ontario, on October 12, 1923.

BLACK DUCK, No. 202,674, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was shot at Zion, on the Otonabee River, 7 miles from Peterboro, Ontario, on September 3, 1923.

BLACK DUCK, No. 202,676, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was shot a few miles from Fenelon Falls, Ontario, on September 29, 1923.

BLACK DUCK, No. 202,677, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was shot near Fort Mott, New Jersey, on November 29, 1923.

BLACK DUCK, No. 202,685, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was shot on the Bradford River, Ontario, on September 3, 1923.

BLACK DUCK, No. 202,686, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was shot about 20 miles east of Orillia, Ontario, on September 3, 1923.

BLACK DUCK, No. 202,691, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was shot in Wicomico Marsh, Wicomico County, Maryland, on December 8, 1923.

GREEN-WINGED TEAL, No. 202,583, banded by H. S. Osler, at Lake Scugog, Ontario, on August 25, 1923, was shot at Frenchman's Bay, 22 miles east of Toronto, Ontario, on September 1, 1923.

GREEN-WINGED TEAL, No. 202,619, banded by H. S. Osler, at Lake Scugog, Ontario, on August 28, 1923, was shot in Pelee Park, Leamington, Ontario, on November 15, 1923.

PINTAIL, No. 232,018, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 12, 1923, was shot at a place on the north edge of Kern County, California, on October 21, 1923.

CANADA GOOSE, No. 232,095, banded by Reuben Lloyd, at Last Mountain Lake, Saskatchewan, on July 30, 1923, was killed at Watertown, Last Mountain Lake, Saskatchewan—date unknown, but reported on October 30, 1923.

SPOTTED SANDPIPER, No. 44,549, banded by Edward C. Knechtel, at Grand Bend (on Lake Huron), Ontario, on July 7, 1923, repeated several times at the same station until July 12, 1923.

SPOTTED SANDPIPER, No. 44,550, banded by Edward C. Knechtel, at Grand Bend, Ontario, on July 7, 1923, repeated several times at the same station until July 12, 1923.

FLICKER, No. 219,927, immature, banded by R. H. Carter Jr., at Muscow, Saskatchewan, on June 24, 1923, was found dead in the nest in which it was banded, on May 10, 1924. It apparently died shortly after it was banded.

CROW, No. 236,618, banded by Ernest Joy, at Wood Island, Grand Manan, New Brunswick, on August 25, 1923, was shot at a place not one-half mile from where it was banded, on August 6, 1924.

BRONZED GRACKLE, No. 108,984, adult male, banded by Hoes Lloyd, at 406 Queen Street, Ottawa, Ontario, on August 7, 1923, was found dead at 297 Gloucester Street, Ottawa, Ontario, on August 23, 1923.

(Continued in March issue)

EDITORIAL

The Wilderness

The wilderness, or the unaltered face of Nature, possesses a powerful influence in human affairs. This influence is felt in a variety of ways, but chiefly in its effect upon the character and the thought of the human individual. Since the earliest times great leaders whose lives and ideas have moulded human opinion and guided humanity's destiny have realized the value of the wilderness to them and have deliberately sought to permit its influence to work freely upon them. Biblical instances of this are numerous; while more recent notable examples are those of Goethe, Charles Darwin, and Theodore Roosevelt. The wilderness affects humanity not only through such leaders, but also by direct influence upon a multitude of individuals of smaller note. The sturdiness and ability of those who come much into contact with it is a matter of common knowledge. At the present day many a person whom civilization has weakened and well-nigh destroyed is soothed and strengthened and brought back to a valuable and capable existence by the inbreathing of Nature at first hand. Even to those who are denied personal experiences in the wilderness, the benefits of that wilderness are great and numerous, though often unrealized. The mere contemplation of the scantily marked areas on a map may be a source of real pleasure and inspiration.

Canada is particularly fortunate in the fact that a large part of its area is still unmarred wilderness. Such country, for example, as that so well described by Mr. G. H. Blanchet in the current volume of *The Canadian Field-Naturalist*, is a splendid possession and one of which, for the present, there is no lack in our Dominion. The nation whose boundaries include large tracts of wild Nature is sure to benefit from it in brain and body and spirit, and to possess great advantage over thickly settled nations. More than anything else, it is the fact that Canada possesses an abundance of wilderness that renders it desirable, above countries less fortunate in this respect, as a place of residence.

The sad condition to which some parts of this continent, once desirable and attractive, have been reduced by modern civilization is briefly described in the following paragraph from the pen of Richard Lieber, Director of the Department of Conservation of the State of Indiana:

"A little over a century of civilization in Indiana has consumed ninety-five per cent of her forest wealth; reduced her soil fertility; converted sparkling rivers into muddy streams; lowered her lakes, greatly impairing their value; drained her marshes that teemed with aquatic life; and initiated many other changes to which much of her native plant and animal life can not adjust themselves. New environments have driven many of our animals and birds away forever; and some of our trees and shrubs have also disappeared or become so rare that in a few years they will be only a memory."

It is at once the privilege and the duty of Canadians, not only to derive present enjoyment and benefit in the fullest possible measure from their wilderness areas, but to be ever vigilant in the protection of these great possessions and in the prevention in their country of anything like a repetition of the fate which has befallen Indiana. Happily, the soil and the climate of much of the Canadian wilderness are such that its destruction will assuredly be retarded, but we ought not to permit this fact to give us a false sense of security. The progress of mechanical invention, the increase of the world's human population, and the lust for money are constantly at work to destroy our wilderness, as those of other nations have been destroyed in the past. While natural obstacles to change might suffice to preserve primeval conditions in at least some areas during our day, yet a right and proper interest in posterity requires that we do all in our power to maintain the best of our wilderness as a priceless heritage for all time.

NOTES AND OBSERVATIONS

Subscriptions for 1925 are now due; by paying promptly you will aid greatly in the efficient publishing of the magazine. The subscription for the year is \$1.50; payment should be made to the Treasurer, Mr. B. A. Fauvel, 321 McLeod St., Ottawa, Ontario. If paying by personal cheque, please include exchange.

Bythinia tentaculata Linn.—Nothing is of greater interest to the student of zoological geography than the occurrence of introduced species, especially when the foreigners firmly establish themselves, spread, multiply and become pernicious. In their native habitats they are held in check by that mysterious balancing of forces on which even man's tenure of life seems to rest. Removed from such influences, they increase inordinately

and often develop into a pest. Many instances might be cited. It is sufficient to mention a few that are but too familiar: the English Sparrow, the San Jose scale, the Gypsy moth and the larch saw-fly.

Excepting the grey European slug, *Limax agrestis* L., which sometimes causes damage in gardens, the molluscs which have invaded Canada rarely cause any economic disturbance. Recently, however, there arrived in the Ottawa a small univalve which, if carried above the Chaudière Falls, would be likely seriously to interfere with our water services.

In September, 1921, on my last visit in that year to the shoals of Duck Island, I was quite astonished to find in my dredge a few examples of a European shell, known as *Bythinia tentaculata* L., never before observed in the Ottawa. As it is a very prolific species, I think the inference may be drawn that its advent is recent, especially as these shoals have been my most favored collecting grounds, visited almost annually for more than forty years.

The first occurrence of this mollusc in Canada so far as known was in the canal at Cornwall about fifteen years ago, and I published a note regarding it in *The Ottawa Naturalist*. Later I found it in great numbers on the inner shores of Centre Island, Toronto. There, as in the Ottawa, it was in my opinion a comparatively recent arrival. Had it occurred anywhere in the vicinity of Toronto in Dr. Brodie's lifetime, it would in all probability have been discovered by that indefatigable naturalist. In 1922 I found the shell to be common in the Bay of Quinte at the Belleville Wharf, a locality from which it was absent in 1918.

No introduced mollusc has spread so rapidly over so wide an area. Its diffusion in the United States is little short of marvellous. It was first found there in 1879, in Lake Ontario, at Oswego, by the late W. M. Beauchamp, who published notes of its occurrence in *The American Naturalist* for September, 1881, and March, 1882, and in his *Land and Fresh Water Shells of Onondaga County*, 1886. In a memorandum attached to a copy of his paper presented to Dr. Bryant Walker the author remarks: "*B. tentaculata* has done well at Mohawk, and is spreading eastward in the Erie Canal from Syracuse; but it does not seem to be making much progress west of that city. It is now (1886?) reported from Lake Champlain. It was very abundant at Oswego, where I first found it."

Later it spread westward with great rapidity. It was recorded by Streator from Ashtabula, Ohio, in 1889, and by Daniels from Indiana in 1901. At Erie, Pa., it multiplied to such an extent that

it interfered with the water supply, especially at the intake wells, several miles out in Lake Erie. According to Dr. Sterki (*Nautilus* XXIV, January, 1911), it was removed from the wells "in wagon loads".

Dr. Walker informs me that it is found at Niagara Falls in incredible numbers. It occurs at several places in Michigan, notably at Harbor Beach, Lake Huron. In Illinois it blocked the water pipes at Lake View, a suburb of Chicago, and frequently issued from the service taps in thousands. The civic authorities invited Professor Frank Collins Baker to investigate the cause of the troublesome conditions. At his instance divers examined the intake tunnel and found its sides coated with millions of the little shell, its eggs and young. By carefully scraping the tunnel and providing a smaller meshed screen for the intake, the nuisance was abated*.

B. tentaculata does not seem to have become established in Lake Superior, or in the upper reaches of St. Mary's River, opposite Sault Ste. Marie, with which I am familiar, though doubtless it has been carried into the river and lake adhering to the hulls of boats from ports on the lower lakes. The shells probably become weak and lose attachment to their carriers as soon as affected by the intensely cold waters of Lake Superior and its outlet.

This undesirable alien was probably brought to the American continent in the marsh grass used in packing crockery or similar commodities. Once established it would multiply rapidly and be carried from place to place adhering to boats and barges. Wherever a few individuals were dropped would become a new focus of dissemination. To the Ottawa it must have been carried from Lake Champlain or the St. Lawrence by vessels engaged in transporting coal or lumber.

The shell is thin, concentrically operculated, semi-transparent, smooth and shining, and of a yellowish horn color. It has about five whorls and is a little less than half an inch in length. Its ordinary range is throughout central Europe.

It is worthy of remark that the only other mollusc which has seriously interfered with a supply of water is also an intruder into England from continental Europe. The mains in London have frequently been clogged with *Dreissena polymorpha*, commonly known as the zebra mussel, imported, as is supposed, in ballast, and now widely distributed in England, Ireland and southern Scotland.

A French naturalist, Bouchard-Chantreaux, has described the proceedings of *B. tentaculata* when laying its eggs. They are from thirty to

**Mollusca of the Chicago Area*, Baker, 1902.

seventy in number, united together in a narrow band. When it desires to lay it selects a smooth stone, or water plant and cleans the surface with its mouth. That done, it contracts its foot, rendering it a third shorter and broader; then, raising the centre of the anterior extremity of the foot so as to form a little canal intended to receive the egg, it withdraws its head within the shell, and directs its muzzle towards the branchial orifice, where an egg appears, which it seizes and guides into the canal to be fixed in its destined place. The sedulous mother then cleans anew the body to which it adheres and deposits a second egg, repeating the operation until all the eggs are expelled and arranged in ribbon fashion, each band when laid by an adult consisting of three rows. The whole process proceeds slowly, time being left between each effort sufficient for the agglutination of the eggs to one another and to the surface on which they are deposited. The young emerge in from twenty to twenty-five days and attain maturity at the end of their second year†.

Fortunately for the Capital, the Chaudière Falls present an almost impassible barrier to the progress up the Ottawa of this little shell and its interference in that unlikely event with our domestic water supply. Apart from a few racing and pleasure craft—to none of which this shell is likely to become adherent—boats are seldom transferred from below the Falls to any point above the intake. In every case the transfer is overland and any shells that might be clinging to a hull would be almost certain to be jolted off during the journey. While *B. tentaculata* may never become a public nuisance at Ottawa, the advent of a species new to the district which has proved to be a pest elsewhere is not without interest, at least to students of the geographical distribution of animal life.

I wish to express my indebtedness for information regarding the spread of this species in the United States to Dr. Bryant Walker and Mr. C. Goodrich, of Detroit, and to Professor Baker, of the University of Illinois.—F. R. LATCHFORD.

MYSTERY BANDS.—A great many persons throughout the continent are carrying on a very interesting plan of work in connection with wild birds. They are capturing these birds either fully grown, or when young, and placing a small numbered aluminium band on the leg of each bird captured.

To avoid confusion, only one set of numbers for the continent is in use, and these numbers are allotted by the Biological Survey, United States Department of Agriculture, at Washington. The

Biological Survey supplies the numbered bands to persons who are co-operating in bird-banding work on this continent. Persons who wish to trap protected birds for the purpose of banding them, require a permit under the Migratory Birds Convention Act before they trap any protected birds, and these permits do not allow birds to be killed. Applications for permits of this nature should be made to the Canadian National Parks Branch, Department of the Interior, Ottawa, and should be accompanied by two reliable testimonials in writing.

Very valuable information has been obtained by banding birds and very much can be learned in this way. It can be found approximately how long each kind of bird will live, whether it will return to the same place year after year, or not, how fast it travels in migration, and many other problems can be solved. Bird protectors are much interested in this work because it gives them a method of carrying on useful scientific investigations without destroying bird life.

The desirability has been recognized of having all bird-banding records, as well as all returns (1) upon birds banded in Canada and captured away from the original banding station, or at the original banding station at a considerably later date, and (2) upon birds banded outside of Canada and captured anywhere in Canada, filed at one central point in Canada, where they will be available for all persons interested. Therefore, the Canadian National Parks Branch is keeping the file of Canadian Bird-Banding Records.

From time to time unofficial bands without traceable marks of identification are sent to the Branch by sportsmen and others who know about the bird-banding investigations being carried on to trace more definitely the migrations of our wild-fowl. Two such bands are described below, and an endeavour is being made to trace their origin. Any information that can be furnished in connection with them will be greatly appreciated by the Branch.

One of the bands was sent in to the Branch with the leg of the Duck on which it was found, and addressed to "The Bird Banding Official". The envelope which contained it is post-marked Ottawa, Canada, March 5, 1924, but no information was given with regard to the sender. The band is made of aluminium about one-half inch wide and has nicked turned-in edges. The inscription "PAT. APPLIED FOR" on the outside is almost worn off. The band will be lent to responsible persons who consider that they may be able to furnish information concerning it.

Mr. C. H. Young, of the Victoria Memorial Museum, Ottawa, reports that on September 15, 1923, Mr. Arthur Harwood, Postmaster of Water-

†Abridged from Forbes & Hanley's *British Mollusca*, Vol. III, p. 13.

ton Park Post Office, Alberta, shot a Mallard drake at Mountain View, Alberta. A pale blue celluloid poultry ring was found on the leg of this drake, but it is not known who placed the ring, as it had no identification mark on it.—HOYES LLOYD.

AN UNUSUAL NEST OF THE MALLARD.—Late in May, 1924, a boy who knew I was interested in birds informed me that he had seen a Duck sitting in an open nest in a tree. On May 27th he took me to the place and showed me the nest, which proved to be that of a Mallard.

The female was sitting and left the nest at our near approach. The nest was an old nest of the Crow which had been partly filled with shredded bark by a squirrel and the Mallard had added down. It was about fifteen feet up in a willow at the edge of an open field and beside a small dry slough. The nest contained ten eggs.

I am informed that the Mallard occasionally nests in this manner, but this is the first instance of it to come under my notice in the vicinity of Belvedere, where the Duck is an abundant breeder.—A. D. HENDERSON.

MIGRATION INCIDENTS.—On May 14, 1924, I sailed on a small steamer from Souris, P.E.I., at 5.00 a.m., and arrived at Amherst Harbor, Magdalen Islands, P.Q., at 4.00 p.m. The entire distance from Souris to Amherst Harbor is about sixty miles. On this occasion the first two-thirds or so of the voyage were made through pack ice, composed of floes and pans four or five feet thick, so closely jammed together that navigation was barely possible and progress was very slow. During the final third of the voyage almost no ice was encountered. The day was fine and the sky was clear until after noon, but a haze filled the air near the ice and water, rendering visibility poor. On our little steamer we could not see more than eight or ten miles in any horizontal direction. Consequently, we could see no land from about 8.00 a.m., when we lost sight of East Point, P.E.I., until about 2.00 p.m., when we sighted Entry Island, Magdalen Islands, P.Q.

Water birds seen during this crossing were only Black Guillemots (18), Loon (sp.?) (3), Gannet (1), Murre (sp.?) (2), Cormorant (sp.?) (10), Old-Squaw (11), and a few Herring Gulls. The Gulls were seen, one or two at a time, at rather long intervals. I was surprised to see no Ducks except the Old-Squaws.

Only two land birds were seen during this voyage. About 8.30 a.m., a Barn Swallow came up from astern, passed low over the steamer, and continued without pausing, heading straight through the haze for the unseen Magdalen Islands.

A male Myrtle Warbler, in very high plumage,

came aboard the steamer about 11.30 a.m. It flitted about the ship for about half an hour, apparently looking for insects or other food. It did not seem to be particularly tired. It was observed on one occasion to alight on a cake of ice in the sea where it remained for a minute or so. This suggests that floating ice may more or less regularly provide perching or resting places for migrant birds passing over the Gulf of St. Lawrence and similar waters in the spring. At any rate, waters in which such ice is plentiful are probably much less dangerous to migrant land birds than they would be if they were free of ice. Mr. Hoyes Lloyd has suggested to me that melting drift ice in the spring may also serve migrant land birds by furnishing fresh water, suitable for drinking, in its hollows. About 12.00 m. the Myrtle Warbler left us and flew on straight ahead of us, a few yards above the water, toward the Magdalen Islands, which we did not make out until some two hours later.—HARRISON F. LEWIS.

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THE PROVINCE OF QUEBEC SOCIETY FOR THE PROTECTION OF BIRDS has again rendered splendid assistance to *The Canadian Field-Naturalist*. The Society purchased at regular rates 300 extra copies of the issue of the magazine for January, 1925, and distributed them among its membership. Each copy thus distributed was accompanied by a form letter which pointed out the desirability of supporting *The Naturalist* by subscribing for it. This form of assistance is not only of immediate financial value but contributes materially to the building-up of that large body of subscribers which is necessary for ultimate relief from financial troubles. Our publishers rose to the occasion and once more displayed their genuine interest in the magazine by printing eight extra pages of text without any extra charge. *The Canadian Field-Naturalist* expresses its appreciation of the aid which it has thus received and hopes that other affiliated organizations may follow the excellent example set by The Province of Quebec Society for the Protection of Birds.—EDITOR.

The cuts for the illustrations in this issue were kindly furnished by the Topographical Survey of Canada.—EDITOR.

CORRESPONDENCE

EDITOR OF *The Canadian Field-Naturalist*,
Ottawa, Can.

Dear Sir:

The Wood Buffalo (*Bison bison athabascæ*) is too important an animal to be subjected to experimentation that may result in decided harm to the entire subspecies. The proposal outlined in a recent number of this journal¹, for introducing large numbers of the Plains Buffalo into the range of the Wood Buffalo, raises anew the old question of man's interference with nature, which, in too many cases, is alike unnecessary and unjustifiable.

The establishment in 1922 of a sanctuary for the Wood Buffalo west of the Slave River was one of the most important and far-sighted conservation measures ever adopted by the Dominion Government. Are the good results of this measure to be endangered by the hasty carrying out of the proposal in question?

In 1907 the total number of Wood Buffaloes was estimated at 300 individuals². In 1914 the estimate had gone up to 500³. While I was at Peace Point in 1920, the buffalo guardians gave me their estimate as 1,000 or more. Mr. Graham's own estimate (1924) is 1,500. Apparently, then, with the good protection afforded in recent years, the Wood Buffaloes have materially increased in number. And so, in due course of time, without experimentation or interference, there is every reason to believe that their numbers will practically reach the maximum that their range can support. Why, then, attempt to force this natural process by introducing overwhelming numbers of a smaller and presumably less hardy stock, reared in enclosures, and not so well fitted as the Wood Buffalo is to survive deep winter snows or to cope with wolves? For countless ages nature has been molding Plains Buffalo to its particular environment, and the Wood Buffalo to its particular and distinct environment. How can it be imagined that the one will suddenly fit harmoniously into the environment of the other?

Interbreeding will undoubtedly take place, and with the introduced Plains Buffalo vastly in the majority, the descendants a few generations hence will naturally have more of the characteristics of the latter than of the Wood Buffalo. Some years ago Mr. Barnum Brown, of the American Museum of Natural History, remarked to the writer, if memory serves him correctly, that the Wood Buffalo specimen collected by the late Harry V.

Radford had a femur *five inches longer* than that of the largest bull in the Wainwright herd. Must the huge and vigorous Wood Buffalo be doomed to deterioration through unnatural interbreeding with its smaller cousin of the Plains?

Mr. Graham intimates that at least the northern herd of Wood Buffalo will be safe from contamination, because of the supposed gap between the ranges of the northern and southern herds. This gap can hardly yet be accepted as a proven fact, or as a necessarily permanent condition. There is evidently no physical barrier that would prevent the two herds from mixing. In 1914 the buffalo guardian, Peter McCallum, described this intervening territory to me as jack-pine country.

The possible transmission of disease through the introduced Plains Buffaloes is another factor to be considered.

If the surplus stock of the Wainwright herd can not be turned out in some of the thinly settled districts of central Alberta, to be hunted under suitable restrictions, would it not be wiser to send them to the slaughter-house at once, rather than to undertake the enormously expensive and difficult job of transporting them to northern Alberta, and leaving them there to work slow but sure havoc through interbreeding with the superb Wood Buffalo? If a single importation of Plains Buffaloes is made, could the effect ever be undone? Could it mean anything less than an unnatural change in the characteristics of practically the only representatives of the genus *Bison* that are left in a perfectly wild and free state?

This whole question is one for competent zoologists to pass upon. Too many serious mistakes have been made in the past through failure on the part of legislators and other government officials to consult zoological authorities in conservation matters. Let the question be submitted to the American Society of Mammalogists at its annual meeting, to be held April 8-10, 1925.

Very truly yours,

FRANCIS HARPER.

Cornell University.
Zoological Laboratory.
Ithaca, New York.
February 14, 1925.

EDITOR, *The Canadian Field-Naturalist*,
Ottawa, Ont.

Dear Sir:

I read with interest Mr. F. Farley's account of the occurrence of Horned Larks in winter in the Camrose district.

I have now spent four winters in the Castor, Alta., district, and would like to record the fact

¹Graham, Maxwell, *Finding Range for Canada's Buffalo*. *Canadian Field-Naturalist*, Vol. 38, Dec., 1924, p. 189.

²Seton, Ernest Thompson, *The Arctic Prairies*, 1911, p. 320.

³Harper, Francis, *The Athabaska-Great Slave Lake Expedition, 1914*. *Summary Rept. Geol. Surv., Canada, for 1914 (1915)* p. 161.

that at no time of the year are we without Horned Larks. At any time of the winter one can find them, sometimes around the farm buildings, often on the bare summer-fallow and more often on the roads, usually from five to twelve in the flock. By the third week of February they are mostly paired off and nesting begins about the middle of

March. I have seen young birds strong on the wing before the end of April.

Yours truly,

THOS. E. RANDALL.

Box 239,

Castor, Alberta,

December 2, 1924.

BOOK REVIEW

SOME REMARKS ON BIRDS, by Dr. George T. McKeough, with A LIST OF THE BIRDS OF THE COUNTY OF KENT, by Dr. G. T. McKeough and J. H. Smith, I.P.S. *Kent Historical Society, Papers and Addresses*, Vol. 6, 1924, pp. 49-74. Published by the Society, Chatham, Ontario.

From the standpoint of the student of zoological literature it is regrettable to find such a list tucked away in a publication that is not generally known or available to the ornithological public. There can be no doubt as to the real value of such lists in the present, and they become historical documents in the future, but at any time they attain their greatest usefulness in publications where they are more naturally expected.

In reviewing faunal lists that of necessity become part of the zoological record, a critical (to the layman it may seem hypercritical) scientific standpoint is necessary. There is scarcely a settled region in this country where an ornithologist can not, from known distributions and probabilities, correctly list ninety per cent of the birds. A local list must be correct in the last ten per cent or it loses its reason for being. It is therefore in these refinements of distributional ornithology that a contemporary critic must criticise most closely in order to judge the scientific reliability of new work for the benefit of students of the future when means of verification are past and gone.

In this light one finds a number of things in these two papers that make it evident that no experienced ornithological eye scanned them before publication. These shake the readers' confidence in other statements where confidence is necessary for full acceptance.

Dr. McKeough shows a certain familiarity with current ornithological literature but it is strange to find him, on page 50, stating that his collaborator was the first to note the deep influence the glacial epochs had on bird life past and present. The bearing of the glaciers on distribution and present migration routes of birds is an old story and has been noted ever since the glacial theory was first advanced.

On page 32 he speaks of the "Crimson Phalarope" in southern Alberta and the Northwest. This new name may possibly refer to the Red Phalarope, which is, however, almost confined to the sea coasts and only of accidental occurrence in the interior. Wilson's Phalarope is the common Phalarope of the region in question and the one probably intended. On page 53 it is stated that the Snowy Owl changes color in winter and then becomes "almost pure white". This species has no seasonal change in color, but a considerable one with age. Young birds are heavily barred with brown. Fully adult ones are nearly immaculate. Western Ontario is not the only Canadian area favored by the presence of the Turkey Buzzard, as is stated on page 57. From Manitoba westward to the Pacific coast it is a regular and more or less common summer resident and nests as far north as Lake Winnipegosis and near Vermilion, Alberta. Vide Lloyd, *The Canadian Field-Naturalist*, XXXVI, 1922, pp. 178-179.

Nor is the Cormorant of Ontario a particularly oceanic species as indicated on page 57. It does nest commonly on the sea coasts, but it also breeds in immense colonies across the prairie provinces.

In the annotated list are a number of interesting records, many of which are probably correct, but in view of collateral evidence they cannot be accepted without further verification. The inclusion of Franklin's Gull as "An occasional one seen in migration"; the substitution of the Mexican Cormorant, *Phalacrocorax vigua mexicanus*, for the Double-crested; the statement that the Avocet "was at one time a fairly common migrant" and the record of the Yellow-throated Vireo as only a passing migrant shake our confidence in other statements where confidence is essential.

There are a large number of typographical errors throughout. No consistent rule of capitalization has been followed, in places type faces have been mixed, and the number of misspellings indicate that the proof of the publication was not carefully read. The list in general follows the order of the current Check-List, but the nomenclature has not been brought up to date and so many of the species are misplaced that the reader cannot find them or be certain of the absence

of any without searching the complete list. 230 species are enumerated, but we miss the names of a number more that most certainly occur within the county.—P. A. T.

THE AUK 1923

(Continued from p. 28.)

ARRIVAL OF BIRDS IN RELATION TO SUNSPOTS.—

By Ralph E. De Lury, pp. 414-419.

The author, an officer in the Dominion Observatory, Ottawa, has obtained some very interesting data on the subject, viz., the records of arrival of the Cuckoo, Lark and Swallow at Montdidier, France, for the years between 1784 and 1869. These he charts and compares with the sunspot and attendant rainfall cycle for the same interval and the similarity of the curves produced is remarkable. In brief, the arrivals are later in the season during the maximum sunspot periods and vice versa. This is probably not a direct result of sunspot activity on the sun's disc but a secondary one dependent upon the weather produced.

THE BIRDS OF WELLINGTON AND WATERLOO COUNTIES, ONTARIO.—By J. Dewey Soper, pp. 489-513.

An annotated faunal list of 206 species. An interesting list from one of the richest ornithological fields in eastern Canada.

EIGHTEENTH SUPPLEMENT TO THE AMERICAN ORNITHOLOGISTS' UNION CHECK-LIST OF NORTH AMERICAN BIRDS.—By the Committee on Nomenclature, pp. 513-525.

Among the authorized changes in the Check-List of direct interest to Canadian ornithologists are the following:

Larus thayeri, Thayer's Gull, a new species added from Buchanan Bay, Ellesmere Land. In winter south to southern British Columbia.

Sterna caspia, Caspian Tern, becomes *Sterna caspia imperator*.

Priocella glacialoides becomes *Priocella antarctica*.

Oceanodroma kaedingi, Kaeding's Petrel, is reduced to a subspecies of Leach's Petrel as *Oceanodroma leucorhoa kaedingi*.

Dafila acuta, Pintail Duck, becomes *Dafila acuta tzitzihua*.

Histrionicus histrionicus pacificus, Western Harlequin Duck, is recognized as a subspecies.

Somateria dresseri, American Eider, becomes a subspecies of co-ordinate rank with the Northern Eider as *Somateria mollissima dresseri*.

Oidemia deglandi dixonii, Dixon's White-winged Scoter, is recognized as a north-western subspecies.

Olor becomes *Cygnus*, hence our Swans will become:

Cygnus columbianus, Whistling Swan.

Cygnus buccinator, Trumpeter Swan.

Philohela becomes *Rubicola*, hence our Woodcock will be *Rubicola minor*.

Gallinula galeata, Florida Gallinule, becomes *Gallinula chloropus cachinnans*.

Tringa becomes *Calidris*, hence the Knot will be *Calidris canutus*.

Machetes becomes *Philomachus*, hence the Ruff will be *Philomachus pugnax*.

The Black-bellied Plover in America becomes the American Black-bellied Plover, *Squatarola squatarola cynosurae*.

Dendragapus obscurus flemingi, Fleming's Grouse; *Bonasa umbellus thayeri*, Nova Scotia Ruffed Grouse; *Bonasa umbellus yukonensis*, Yukon Ruffed Grouse; and *Zenaidura macroura caurina*, Dusky Mourning Dove, are accepted as subspecies.

Aluco pratincola, Barn Owl, becomes *Tyto alba pratincola*.

Falco sparveria, Sparrow Hawk, becomes *Cerchneis sparveria*.

Cryptoglaux acadica brooksi, Island Saw-whet Owl; *Bubo virginianus lagophonus*, Northwestern Horned Owl; *Bubo virginianus occidentalis*, Pale Horned Owl; *Bubo virginianus neochorus*, Newfoundland Horned Owl, *Glaucidium gnoma swarthi*, Vancouver Pygmy Owl; *Glaucidium gnoma grinnelli*, Coast Pygmy Owl; *Dryobates villosus sitkensis*, Sitka Hairy Woodpecker; *Dryobates pubescens microleucus*, Newfoundland Downy Woodpecker; *Dryobates pubescens glacialis*, Valdez Downy Woodpecker; *Phlaeotomus pileatus picinus*, Western Pileated Woodpecker; and *Colaptes auratus borealis*, Boreal Flicker, are accepted as subspecies.

Colaptes cafer saturator, Northwestern Flicker, becomes *Colaptes cafer cafer*.

Perisoreus canadensis sanfordi, Newfoundland Jay, is accepted as a subspecies.

Corvus caurinus, Northwestern Crow, is reduced to a subspecies of the American Crow as *Corvus brachyrhynchos caurinus*.

Pinicola enucleator eschatosus, Newfoundland Pine Grosbeak, and *Loxia curvirostra perna*, Newfoundland Crossbill, are accepted as subspecies.

Zamelodia becomes *Hedymeles*, so that we have:

Hedymeles ludovicianus, Rose-breasted Grosbeak.

Hedymeles melanocephalus, Black-headed Grosbeak.

Dendroica coronata hooveri, Hoover's Warbler, is accepted as a subspecies.

Ixobrychus neoxenus, Cory's Least Bittern, and *Cryptoglaux acadica scotæa*, Northwestern Saw-whet Owl, are eliminated.

NOTES ON THE DIVING OF LOONS AND DUCKS.—

By Nap. A. Comeau, p. 525.

This is an addition to a current discussion on the under-water use of wings by diving birds.

MOURNING DOVE AT CAP ROUGE, QUEBEC.—By

Gus. A. Langelier, p. 532.

This is an interesting record of a species rare near Quebec.

THE STARLING (*Sturnus vulgaris*) BREEDING AT

HATLEY, QUEBEC.—By Henry Mousley, p. 539.

The first breeding record for this species in Canada.

WHEATEAR AT GODBOUT, QUEBEC.—By Nap. A.

Comeau, pp. 544-545.

A summary of all his records of the species at Godbout from 1884 to 1922. This is the last published work of this veteran naturalist of the "North Shore", whose obituary has previously appeared in these pages.

FURTHER NOTES ON LAKE COUNTY, MINNESOTA, BIRDS.—By Charles E. Johnson, pp. 547-548.

Adding four species to the list of birds of this locality, which closely adjoins a part of Ontario that is ornithologically almost unknown.

Under *Correspondence*, p. 571, is a letter by Hoyes Lloyd presenting a resolution of the Ottawa Field-Naturalists' Club, which urges that exact information regarding the locality of occurrence of the nesting places of certain rare birds be placed in the private records of responsible institutions but withheld from publication.

On pp. 572-573 is reported the death at Forest Glen, Maryland, on April 9, 1923, of the Rev. James Hibbert Langille. Mr. Langille was born at Mahone Bay, N.S., September 12, 1841. He is best known as the author of *Our Birds in Their Haunts*, a book that has had wide circulation and has guided many budding ornithologists.

ON THE NESTING GROUNDS OF THE SOLITARY SANDPIPER AND THE LESSER YELLOWLEGS.—

By J. Fletcher Street, pp. 577-583.

This paper, accompanied by 4 interesting photographs, reports and describes the nesting of these species near Bowden, Alberta, in the summer of 1923.

FURTHER NOTES ON THE BREEDING OF THE STARLING (*Sturnus vulgaris*) AT HATLEY, QUE.—

By Henry Mousley, pp. 694-695.

Further report on the nest previously reported, and announcement of another one.

SOME RECENT RECORDS FOR BRITISH COLUMBIA.—

By Allan Brooks, pp. 700-701.

Recording the taking of Wilson's Phalarope, adult male Black Merlin, and Dickcissel, as well as a sight record of the Ferruginous Rough-legged Hawk in British Columbia.

On page 722 is announced the death of James Stirton Wallace, a nature lover whom many naturalists will miss. He was born in Southampton, Bruce County, Ontario, in 1868, and died at Smith's Falls, Ontario, July 24, 1922, as the result of an accident. He was a member of the Ottawa Field-Naturalists' Club.—P. A. T.

PUBLICATIONS RECEIVED

Journal of the Elisha Mitchell Scientific Society. Vol. XL. Nos. 1 and 2. August, 1924. Chapel Hill, N.C., U.S.A.

The Mascoutens or Prairie Potawatomi Indians. Part I, Social Life and Ceremonies, by Alanson Skinner. Bulletin of the Public Museum of the City of Milwaukee. Vol. 6, No. 1, Pp. 1-262, Plates 1-8, Figs. 1-2. November 10, 1924. Milwaukee, Wis., U.S.A.

Monthly Weather Map, October, 1924. Meteorological Service, Dominion of Canada.

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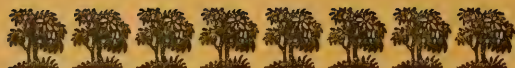
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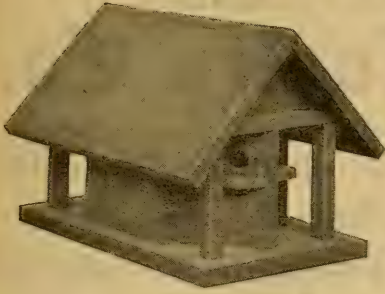
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VOL. XXXIX

OTTAWA, ONTARIO, MARCH, 1925

No. 3

A PRELIMINARY LIST OF THE BIRDS OF THE LINDSAY DISTRICT, ONTARIO

By E. W. CALVERT

THE DATA in the following preliminary list have been obtained from many localities within an approximate radius of twenty miles of Lindsay, including portions of some three counties and fifteen townships. Four prominent lakes and some dozen smaller ones or portions of others, four rivers and many small streams serve to attract large numbers of water birds, particularly those frequenting marshy areas. The territory here considered is chiefly rolling or undulating in character, but some localities are rugged. These reach, in the extreme northern and southern regions, an elevation of over 1000 feet above sea level. The lowest elevation (some 800 feet) is found in the eastern extremity and the average for the district is under 900 feet.

The timber remaining consists, in the uplands, chiefly of patches of hardwood, with sugar maple, beech and basswood usually predominating, but often replaced by hemlock, white pine or other species on lighter soils. The swampy areas originally contained arbor-vitæ, balsam fir, white and black spruce, white elm, silver maple and larch. The "second growth" on burned-over areas is usually composed of poplars and willows, but white birch and larch also occur. The coniferous growth serves to attract many species of Warblers which are typical of the Canadian zone; members of other groups occur in like manner. The depletion has, however, caused many species to become less frequent in recent years. The water-frequenting groups are exceptionally well favored, but shore birds as a class are not numerous.

The fauna of the district is fairly typical Alleghanian in the vicinity of Lindsay to an elevation of about 900 feet, but northward from about the latitude of Sturgeon Lake, and possibly in Durham County, a Canadian influence is perceptible. Such species as the Myrtle Warbler, Winter Wren, Junco, and Red-breasted Nuthatch are present in large numbers within these areas, while the Olive-sided Flycatcher is evenly distributed throughout, where local conditions permit, Durham County excepted. The writer wishes to acknowledge the use made of notes in the list of summer birds of Pleasant Point, by Mr. E. M. S.

Dale, published in *The Naturalist* for March, 1915. Thanks are also due to Mr. W. G. Brooks, taxidermist, of Lindsay, Mr. Charles Parkin, former Game Overseer, of Valentia, and others.

1. *Colymbus auritus*. HORNED GREBE.—Frequent migrant on Scugog Lake and River.

2. *Podilymbus podiceps*. PIED-BILLED GREBE.—Common summer resident on all the larger lakes and streams; abundant in fall migrations.

3. *Gavia immer*. LOON.—Frequent migrant locally. Breeds on Scugog and possibly Sturgeon Lake.

4. *Larus argentatus*. HERRING GULL.—Common migrant, abundant locally, occasional throughout the summer. Many non-breeding birds spend the summer on Scugog Lake.

5. *Larus delawarensis*. RING-BILLED GULL.—A common migrant on Sturgeon Lake (Dale).

6. *Larus philadelphia*. BONAPARTE GULL.—Frequent fall migrant on Sturgeon and Scugog Lakes.

7. *Sterna caspia imperator*. COUE'S CASPIAN TERN.—Frequent fall migrant on Sturgeon Lake (Dale).

8. *Sterna hirundo*. COMMON TERN.—Scarce migrant. A flock of fourteen observed at Scugog Lake, near Port Perry, May 27, 1924.

9. *Chlidonias nigra surinamensis*. BLACK TERN.—Common summer resident on the marshes where there are stumps.

10. *Mergus americanus*. AMERICAN MERGANSER.—Frequent migrant in early spring on Scugog Lake. Several wintered at Fenelon Falls in 1919-20.

11. *Mergus serrator*. RED-BREASTED MERGANSER.—Tolerably common migrant on Sturgeon and Scugog Lakes.

12. *Lophodytes cucullatus*. HOODED MERGANSER.—Tolerably common locally. Observed in summer in Ops and Mariposa townships and may breed.

13. *Anas platyrhynchos*. MALLARD.—A not common migrant. Two males mounted by Mr. W. G. Brooks were taken near Lindsay in the fall of 1919. A pair observed April 6 and one April 13, 1924, near Port Perry.

14. *Anas rubripes*. BLACK DUCK.—A tolerably common breeder, common locally; some young hatched by June 1. Abundant migrant on the lakes and larger streams. Occasional in winter; one near Reaboro, December 22, 1919.

15. *Nettion carolinense*. GREEN-WINGED TEAL.—Tolerably common migrant locally. One taken near Reaboro in the fall of 1919. Several seen in early April, 1924, near Port Perry.

16. *Querquedula discors*. BLUE-WINGED TEAL.—Tolerably common in summer at Port Perry, probably breeds.

17. *Dafila acuta tzitzihoo*. AMERICAN PINTAIL.—Migrant in the Scugog region, not common. Seen in April and May, 1924, in Cartwright township, chiefly in pairs.

18. *Aix sponsa*. WOOD DUCK.—Summer resident along the Scugog River, now scarce. Several that had been taken there were mounted by Mr. W. G. Brooks in the fall of 1919. Reported near Port Perry in April, 1924.

19. *Marila americana*. REDHEAD.—A not common migrant; most numerous on Scugog Lake.

20. *Marila marila*. SCAUP DUCK.—Common migrant on the lakes.

21. *Marila affinis*. LESSER SCAUP DUCK.—Common migrant on Scugog Lake.

22. *Marila collaris*. RING-NECKED DUCK.—Common migrant at Port Perry; frequents the marsh.

23. *Glaucionette clangula americana*. AMERICAN GOLDEN-EYE.—Common migrant on the lakes and rivers. Several wintered at Fenelon Falls in 1919-20.

24. *Charitonetta albeola*. BUFFLE-HEAD.—Migrant; frequent on Scugog Lake and River.

25. *Clangula hyemalis*. OLD-SQUAW.—Spring migrant on Scugog Lake, not common.

26. *Oidemia deglandi*. WHITE-WINGED SCOTER.—One mounted by Mr. W. G. Brooks was taken on Sturgeon Lake. Reported at Scugog Lake but not common there.

27. *Branta canadensis canadensis*. CANADA GOOSE.—A frequent migrant.

28. *Cygnus columbianus*. WHISTLING SWAN.—One seen April 10, 1924, near Port Perry; also reported there previously.

29. *Botaurus lentiginosus*. BITTERN.—Common summer resident; abundant locally.

30. *Ixobrychus exilis*. LEAST BITTERN.—Scarce summer resident, more numerous in early fall.

31. *Ardea herodias herodias*. GREAT BLUE HERON.—Common summer resident, very common locally. Formerly a colony of some fifty pairs bred in south Ops.

32. *Butorides virescens virescens*. GREEN HERON.—Scarce summer resident along Scugog River and its tributaries.

33. *Nycticorax nycticorax naevius*. BLACK-CROWNED NIGHT HERON.—Young frequently observed in July, 1924, near Port Perry. A bird in immature plumage taken along the Scugog River in 1919.

34. *Rallus virginianus*. VIRGINIA RAIL.—A tolerably common summer resident on Scugog and Pigeon waters.

35. *Porzana carolina*. SORA.—Common summer resident along the lakes and rivers locally.

36. *Gallinula chloropus cachinnans*. FLORIDA GALLINULE.—Very common summer resident along the rivers and lakes locally.

37. *Fulica americana*. AMERICAN COOT.—Tolerably common summer resident on Scugog River and Scugog Lake.

38. *Rubicola minor*. WOODCOCK.—Tolerably common summer resident locally.

39. *Gallinago delicata*. WILSON'S SNIPE.—Common migrant and summer resident on larger marshes; abundant migrant at Scugog Lake.

40. *Pelidna alpina sakhalina*. RED-BACKED SANDPIPER.—Migrant on Scugog Lake, not common.

41. *Totanus melanoleucus*. GREATER YELLOW-LEGS.—Migrant of varying abundance; often common in spring.

42. *Totanus flavipes*. YELLOW-LEGS.—A not common spring migrant.

43. *Tringa solitaria solitaria*. SOLITARY SANDPIPER.—Tolerably common; observed almost every summer.

44. *Actitis macularia*. SPOTTED SANDPIPER.—Common summer resident; breeds.

45. *Squatarola squatarola cynosurae*. AMERICAN BLACK-BELLIED PLOVER.—Two records. Observed near Sturgeon Lake (Dale). An immature bird taken near Sturgeon Lake in 1919 was mounted by Mr. W. G. Brooks.

46. *Oxyechus vociferus*. KILLDEER.—Common summer resident; young hatched the last week of May.

47. *Charadrius semipalmatus*. SEMIPALMATED PLOVER.—Migrant; probably not common.

48. *Bonasa umbellus togata*. CANADA RUFFED GROUSE.—Common resident; was becoming less common previous to legislation for its protection. Some young hatched about May 25 in Cartwright township.

49. *Zenaidura macroura carolinensis*. MOURNING DOVE.—Tolerably common summer resident, preferring swamps. Breeds; common at Port Perry. Apparently on the increase. One observed December 14, 1919, south of Reaboro.

50. *Circus hudsonius*. MARSH HAWK.—Common summer resident on large marshes, tolerably common elsewhere; common migrant; abundant

locally. Some young hatched by June 1. Several individuals observed with snakes; birds also taken.

51. *Accipiter velox*. SHARP-SHINNED HAWK.—A not common summer resident; more numerous in migrations.

52. *Accipiter cooperi*. COOPER'S HAWK.—Scarce; possibly a summer and sometimes a winter resident.

53. *Astur atricapillus atricapillus*. GOSHAWK.—Scarce fall and winter visitor. A young bird taken, in November, 1919, near Lindsay.

54. *Buteo borealis borealis*. RED-TAILED HAWK.—Scarce summer resident; tolerably common locally in large woods (Blackstock).

55. *Buteo lineatus lineatus*. RED-SHOULDERED HAWK.—Frequent summer resident in Ops and Cartwright; not recorded in Fenelon.

56. *Buteo platypterus*. BROAD-WINGED HAWK.—Rather scarce migrant in Ops; tolerably common in summer in Cartwright.

57. *Archibuteo lagopus sancti-johannis*. ROUGH-LEGGED HAWK.—A scarce fall migrant.

58. *Haliaeetus leucocephalus alascanus*. NORTHERN BALD EAGLE.—Rare migrant at Scugog Lake.

59. *Cerchneis sparveria sparveria*. SPARROW HAWK.—Tolerably common summer resident.

60. *Pandion haliaetus carolinensis*. OSPREY.—Scarce migrant at Sturgeon Lake, frequent at Scugog Lake.

61. *Asio flammeus*. SHORT-EARED OWL.—One observed and frequently heard during June and July, 1924, near Port Perry.

62. *Strix varia varia*. BARRED OWL.—One taken near Bethany in winter of 1917-18 and one at Fenelon Falls on December 29, 1919.

63. *Scotiaptex nebulosa nebulosa*. GREAT GREY OWL.—Rare. Two taken near Reaboro many years ago, and one in the winter of 1918; the latter mounted by Mr. Brooks.

64. *Cryptoglaux funerea richardsoni*. RICHARDSON'S OWL.—Near Reaboro seen February 8 and March 16, 1914; one taken January 14, 1915.

65. *Cryptoglaux acadica acadica*. SAW-WHET OWL.—Scarce. One taken in 1919. One found dead near Reaboro in 1903. Seen near Port Perry, March 25 and 26, 1924.

66. *Otus asio asio*. SCREECH OWL.—Tolerably common resident locally, the gray phase apparently predominating.

67. *Bubo virginianus*. GREAT HORNED OWL.—A tolerably common resident in large swamps. Great variation in late fall, the colors indicating an influx from the northwest and northeast.

68. *Nyctea nyctea*. SNOWY OWL.—Scarce winter visitor; irregular.

69. *Coccyzus erythrophthalmus*. BLACK-BILLED CUCKOO.—Frequent summer resident.

70. *Ceryle alcyon alcyon*. BELTED KINGFISHER.—Common summer resident; very common locally along the lakes and rivers.

71. *Dryobates villosus villosus*. HAIRY WOODPECKER.—Common resident where woods obtain.

72. *Dryobates pubescens medianus*. DOWNY WOODPECKER.—Common resident.

73. *Picoides arcticus*. ARCTIC THREE-TOED WOODPECKER.—Frequently observed singly from October, 1904, to January, 1905.

74. *Sphyrapicus varius varius*. YELLOW-BELLIED SAPSUCKER.—Common migrant; frequent summer resident; rare in winter (1919-20).

75. *Melanerpes erythrocephalus*. RED-HEADED WOODPECKER.—A rather common summer resident locally.

76. *Colaptes auratus borealis*. BOREAL FLICKER.—Very common summer resident. Apparently more numerous fifteen years ago.

77. *Antrostomus vociferus vociferus*. WHIPPOORWILL.—Frequent summer resident, common locally.

78. *Chordeiles virginianus virginianus*. NIGHT-HAWK.—Common summer resident, very common at Bobcaygeon.

79. *Chaetura pelagica*. CHIMNEY SWIFT.—Common summer resident, rather local. Formerly abundant in Lindsay, where frequently hundreds of birds were observed circling around a certain high chimney.

80. *Archilochus colubris*. RUBY-THROATED HUMMINGBIRD.—Tolerably common summer resident, local.

81. *Tyrannus tyrannus*. KINGBIRD.—A very common summer resident.

82. *Myiarchus crinitus*. CRESTED FLYCATCHER.—Common summer resident.

83. *Sayornis phoebe*. PHOEBE.—Common summer resident. First brood hatches about the last week of May.

84. *Nuttallornis borealis*. OLIVE-SIDED FLYCATCHER.—Frequent summer resident. Have observed it during summer in about twenty pieces of coniferous timber in southern Victoria. Not observed in Cartwright or Scugog townships.

85. *Myiochanes virens*. WOOD PEWEE.—Common summer resident.

86. *Empidonax traillii alnorum*. ALDER FLYCATCHER.—Frequent summer resident in small swampy growth; very common locally.

87. *Empidonax minimus*. LEAST FLYCATCHER.—Frequent summer resident, common migrant.

(To be concluded.)

AN EXPLORATION INTO THE NORTHERN PLAINS NORTH AND EAST OF GREAT SLAVE LAKE, INCLUDING THE SOURCE OF THE COPPERMINE RIVER

By G. H. BLANCHET, F.R.G.S.
of the Topographical Survey of Canada

(Concluded from Page 34)

BIRD LIFE OF THE NORTHERN PLAINS

The birds of the woodlands generally range to the limit of the trees and as these have been studied at many points they need not be considered here. In the open plains, however, observations have not been so complete and a list of those birds observed to be breeding there is attached.

Bird life is not abundant and songsters are almost lacking. The loud, ringing cry of the Loon the harsh notes of the Gull and the Raven, the burr of the Ptarmigan and the rather plaintive call of the Lapland Longspur are almost the only bird notes heard.

The question of food controls the habits of the various species. For those living on berries and leaves the country offers an abundant supply. In the case of insect-eaters the situation is not so favorable. While the mosquitoes and flies are in season in July and early August, the supply is abundant, but, lacking these, insect-eating birds have little other resource. There are no ants in the open plains and very few insects other than those of the air and water. The flies disappear abruptly with the cold storms of August and the Lapland Longspurs and others depending on them suffer great hardship till the fledglings are sufficiently grown for the southerly migration about the middle of August.

The Hawks and Jaegers that feed on the smaller birds, mice, etc., and the Gulls which eat fish and carrion indiscriminately appear to thrive.

Many young were breaking from the shell in early July.

The following is a list of the birds noted in the open plains. Of them the Yellow-billed Loon is the most interesting, for, though he has often been seen along the Arctic Coast, he has seldom been observed on his breeding grounds. Some hundreds were seen during the season, each pair with two young.

LIST OF BIRDS OBSERVED

1. *Gavia immer*. LOON.—Very scarce. This species was seen on Artillery and Clinton-Colden Lakes.

2. *Gavia adamsi*. YELLOW-BILLED LOON.—This is the common Loon of the Barren Lands and its loud, ringing calls may be heard at any time.

3. *Gavia pacifica*. PACIFIC LOON.—This species was not at any time as plentiful as the Red-

throated Loon, but was noted through the whole district.

4. *Gavia stellata*. RED-THROATED LOON.—Quite common through the entire district. Red-throated Loons prefer the small ponds during the summer and there they nest among the reeds.

5. *Stercorarius parasiticus*. PARASITIC JAEGER.—This species becomes very plentiful to the north and west of the west end of Aylmer Lake. It lives almost entirely on Longspurs and waders which it captures on the wing.

6. *Stercorarius longicaudus*. LONG-TAILED JAEGER.—Very plentiful from the north end of Artillery Lake, northwards and to the west. These birds prefer the low, swampy country and live mainly on small birds and mice.

7. *Larus californicus*. CALIFORNIA GULL.—Odd pairs were seen throughout the whole area.

8. *Sterna paradisæa*. ARCTIC TERN.—A few small colonies were noted on all the larger lakes of the district.

9. *Mergus serrator*. RED-BREASTED Merganser.—These Ducks are not plentiful but a few were seen on most of the lakes and rivers.

10. *Anas platyrhynchos*. MALLARD.—A few birds were seen on the Outram River.

11. *Nettion carolinense*. GREEN-WINGED TEAL.—A number were seen on the Outram River and on the east end of McKay Lake.

12. *Dafila acuta iztzihoa*. AMERICAN PINTAIL.—One flock of young were seen on a small pond on the south shore of Clinton-Colden Lake.

13. *Clangula hyemalis*. OLD-SQUAW.—Old-squaw Ducks are common throughout the entire district and were noted breeding in many places. They prefer the small grassy sloughs for breeding but collect in large flocks on the large lakes when the young are able to fly.

14. *Oidemia perspicillata*. SURF SCOTER.—Surf Scoters were not seen past Artillery Lake.

15. *Anser albifrons* (subsp.?). WHITE-FRONTED GOOSE.—This is the only species of Goose noted in this area. Numerous flocks of young were seen on the Outram River and on the east end of McKay Lake. The young were beginning to fly about August 12th.

16. *Lobipes lobatus*. NORTHERN PHALAROPE.—Very common throughout the whole area. Breeding around the small grassy ponds.



FIGURE 8.—THE MEETING WITH THE INDIANS AT THE LAST WOODS, ARTILLERY LAKE

The stocking up with dry meat and caribou skins in the fall during the caribou migration rivals in importance the fall whitefish fishery, when the winter's supply of dog feed is collected. The first question of the Indians was "had we seen the Eskimos", their dreaded enemies.

17. *Micropalama himantopus*. STILT SAND-PIPER.—Very plentiful along the Casba River and around Clinton-Colden.

18. *Pisobia maculata*. PECTORAL SANDPIPER.—Not very plentiful. Found breeding on Clinton-Colden Lake and in the country east of Lac de Gras.

19. *Pisobia bairdi*. BAIRD'S SANDPIPER.—Very plentiful over the entire area.

20. *Ereunetes pusillus*. SEMIPALMATED SAND-PIPER.—Not so plentiful as Baird's Sandpiper, but found over the whole area.

21. *Totanus flavipes*. YELLOW-LEGS.—One pair seen July 15th on Artillery Lake. The young were half-grown at this time.

22. *Pluvialis dominica dominica*. GOLDEN PLOVER.—Quite numerous along Casba River and in the country east of Lac de Gras. Breeding wherever seen.

23. *Charadrius semipalmatus*. SEMIPALMATED PLOVER.—Rather rare, but a few may be found at any point.

24. *Lagopus lagopus lagopus*. WILLOW PTARMIGAN.—These birds are very plentiful and may be found from the sparsely wooded country out onto the Barren Lands. They were found through the entire district covered during the trip.

25. *Lagopus rupestris rupestris*. ROCK PTARMIGAN.—Not so plentiful as the Willow Ptarmigan and generally frequents the high, rocky country. Found in the same range.

26. *Circus hudsonius*. MARSH HAWK.—A few noted around Artillery Lake and McKay Lake.

27. *Accipiter velox*. SHARP-SHINNED HAWK.—One pair noted near the west end of McKay Lake, in the last woods.

28. *Archibuteo lagopus sancti-johannis*. ROUGH-LEGGED HAWK.—One pair noted on Artillery Lake, but the species became quite plentiful around Lac de Gras.

29. *Falco peregrinus anatum*. DUCK HAWK.—Very rare. Odd pairs may be found at any place.

30. *Asio flammeus*. SHORT-EARED OWL.—A few individuals seen around McKay Lake and to the north near Lac de Gras.

31. *Otocoris alpestris* (subsp.?). HORNED LARK.—A few birds scattered over the whole area.

32. *Acanthis linaria linaria*. REDPOLL.—Distributed like the Tree Sparrow, but the Redpolls are more plentiful near the tree-line.

33. *Plectrophenax nivalis nivalis*. SNOW BUNTING.—Very plentiful around Clinton-Colden and Aylmer Lakes and Lac de Gras. A few birds seen on Artillery and McKay Lakes.

34. *Calcarius lapponicus lapponicus*. LAPLAND LONGSPUR.—Very plentiful over the entire area. Breeds from the tree-line east and north.

35. *Calcarius pictus*. SMITH'S LONGSPUR.—Quite numerous on Artillery Lake.

36. *Passerculus sandwichensis* (subsp.?). SAVANNAH SPARROW.—Fairly common throughout the whole area.

37. *Zonotrichia querula*. HARRIS'S SPARROW.—The breeding range of this Sparrow is not definitely known but in the past summer it was found to be very abundant in the country along the edge of the Barren Lands. It nests on the ground, usually under a small bush, and the nests resemble those of the White-crowned Sparrow.

38. *Spizella monticola monticola*. TREE SPARROW.—May be found anywhere in the district and is very abundant wherever any scrub appears.

39. *Anthus rubescens*. PIPIT.—A few birds may be found at any point, but they were nowhere plentiful.

FISHERIES

The fisheries of the northern lakes are an asset of importance. Certain species reach a development in these northern waters that is probably unequalled elsewhere. The water is so clear that a white object may be seen down to a depth of fifty feet. The two chief varieties are the whitefish and the trout. The whitefish averages about three pounds, but reaches as high as ten, and is unrivalled in any other part of the country for quality. The lake trout is also a native of these waters of outstanding excellence. There is a considerable range in the characteristics of the trout, especially in the colour and markings, but there has never been sufficient study given to them to determine whether these are accidental or the distinguishing marks of subspecies. They were seen as heavy as forty pounds, but in the more northerly waters a more usual weight would be about six to ten pounds.

GENERAL OBSERVATIONS

The unfavorable impression which the name generally applied to the treeless country of the North, the Barren Lands, creates, should be corrected by a more truly descriptive name, one which will unite the different districts under some common characteristic and leave them open to be interpreted as they are found. Perhaps we cannot do better than follow the analogy of the plains of Western Canada. These are given location and character by the name, the "Western Plains" and the open plains of the North might similarly be described as the "Northern Plains".

From the observations made on the trip, the information gathered from the natives, and that contained in narratives and reports, it is neither safe to predict a great future for the north country nor to dismiss it as valueless. It should be considered of potential value for present day economics and as one of the great reserve areas for the future. It supports only the primitive nomadic form of human life and a strongly migratory fauna, its vegetation is restricted and its climate severe, but these conditions have been met and overcome in other parts of the world where resources of sufficient value have been found. Its lack of soil in some places may be compensated for by the resulting exposure of its rock formations with their minerals in others, excellent water-powers are numerous, and it is one of the few great areas where fur and wild life have been little disturbed. Its ranges have demonstrated their possibilities in supporting abundant life. Viewing the so-called "Barren Lands" in August, with their plains and undulating hills stretching on all sides to the horizon, enlivened by the colours of its vegetation and animated by the roving bands of caribou, it seems incredible that the country is destined to remain an unproductive waste.

OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS*

(Continued from page 40)

WHITE-THROATED SPARROW, No. 28,153, banded by Eric Kiteley, at Winnipeg, Manitoba, on August 27, 1923, repeated at the same place until September 12, 1923.

WHITE-THROATED SPARROW, No. 28,154, banded by Eric Kiteley, at Winnipeg, Manitoba, on August 27, 1923, repeated at the same place until September 5, 1923.

BARN SWALLOW, No. 59,452, banded by Wilfrid Scott, at Guelph, Ontario, on June 26, 1923, repeated at the same station on July 11, 1923.

BARN SWALLOW, No. 59,455, banded by

Wilfrid Scott, at Guelph, Ontario, on June 26, 1923, repeated at the same station on July 11, 1923.

BARN SWALLOW, No. 36,899, banded by Ernest Joy, at Wood Island, Grand Manan, New Brunswick, on August 16, 1923, was caught in a wire fence and found dead at Seal Cove, Grand Manan, New Brunswick, on September 11, 1923.

CEDAR WAXWING, No. 46,212, young, banded by W. A. Oswald, at Pointe Claire, Quebec, on August 26, 1923, died in its nest shortly after it was banded.

TENNESSEE WARBLER, No. 74,615, banded by Hoyer Lloyd, at Ottawa, Ontario, on August 29, 1923, died in the same vicinity the following day.

*Published by authority of the Canadian National Parks Branch, Department of the Interior, Canada.

HOUSE WREN, No. 83,524, nestling, banded by R. H. Carter Jr., at Muscow, Saskatchewan, on August 7, 1923, was found dead under its nest on September 25, 1923.

HOUSE WREN, No. 83,534, nestling, banded by R. H. Carter Jr., at Muscow, Saskatchewan, on August 7, 1923, was found dead in its nest, on April 20, 1924. It had probably died soon after it was banded.

ROBIN, No. 109,902, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 1, 1923, was found dead at a place five miles south of the banding station, on September 6, 1923.

MALLARD, No. 232,330, female, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on September 6, 1923, was killed at a place ten miles east of Scottsbluff, Nebraska, on December 8, 1923.

MALLARD, No. 297,151, male, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot at a place seventy miles north-east of Toronto, in Township of Manverson, Durham County, Ontario, on October 6, 1923.

MALLARD, No. 297,152, male banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was killed on the Scugog River, four miles north of Lindsay, Ontario, on November 2, 1923.

MALLARD, No. 297,154, female, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was killed at Morattico, Virginia, on January 21, 1924.

MALLARD, No. 297,345, banded by H. S. Osler, at Lake Scugog, Ontario, on October 4, 1923, was killed at a place about twelve miles south of Georgetown, South Carolina, on December 26, 1923.

MALLARD, No. 297,376, banded by H. S. Osler, at Lake Scugog, Ontario, on October 6, 1923, was killed at Richmond Dale, Ohio, on December 24, 1923.

MALLARD, No. 297,422, banded by H. S. Osler, at Lake Scugog, Ontario, on October 9, 1923, was shot at North Branch, Michigan, on November 14, 1923.

MALLARD, No. 1,405, female, banded by Miss Gussie Innes, at Headingly, Manitoba, on November 6, 1923, was killed at a place thirty miles south of Stuttgart, Arkansas—no date given, but reported on November 24, 1923.

BLACK DUCK, No. 202,697, banded by H. S. Osler, at Lake Scugog, Ontario, on September 1, 1923, was captured at a place between Sandusky and Toledo, Ohio—no date given, but reported on October 17, 1923.

BLACK DUCK, No. 202,700, banded by H. S. Osler, at Lake Scugog, Ontario, on September 1, 1923, was killed at St. Clair Flats, Michigan, on October 19, 1923.

BLACK DUCK, No. 296,006, banded by H. S. Osler, at Lake Scugog, Ontario, on September 1, 1923, was killed at the Crane Lake Club, Saidora, Illinois, on December 7, 1923.

BLACK DUCK, No. 296,010, banded by H. S. Osler, at Lake Scugog, Ontario, on September 1, 1923, was killed in the rice fields of Jehossee Island, South Carolina, about thirty miles southwest of Charleston, about November 20, 1923.

BLACK DUCK, No. 296,023, banded by H. S. Osler, at Lake Scugog, Ontario, on September 2, 1923, was shot on the Rideau Canal, between Kingston and Ottawa—no date given, but reported on September 5, 1923.

BLACK DUCK, No. 296,035, banded by H. S. Osler, at Lake Scugog, Ontario, on September 3, 1923, was found dead at a place seven miles west of Wedowee, Randolph County, Alabama, on December 11, 1923.

BLACK DUCK, No. 296,042, banded by H. S. Osler, at Lake Scugog, Ontario, on September 3, 1923, was shot at Allison's Bay, Prince Edward County, Ontario, on September 8, 1923.

BLACK DUCK, No. 296,046, banded by H. S. Osler, at Lake Scugog, Ontario, on September 3, 1923, was killed in the same vicinity, during the fall of 1924, before November 26th.

BLACK DUCK, No. 296,054, banded by H. S. Osler, at Lake Scugog, Ontario, on September 4, 1923, was shot in the cove of Salmon Island, on the Bay of Quinte, Ontario, on September 7, 1923.

BLACK DUCK, No. 296,059, banded by H. S. Osler, at Lake Scugog, Ontario, on September 4, 1923, was shot on Sand Bank Beach, dividing Lake Ontario and West Lake, Prince Edward County, Ontario, on September 5, 1923.

BLACK DUCK, No. 296,065, banded by H. S. Osler, at Lake Scugog, Ontario, on September 4, 1923, was killed near Chestertown, Maryland, on December 23, 1923.

BLACK DUCK, No. 296,069, banded by H. S. Osler, at Lake Scugog, Ontario, on September 4, 1923, was wounded and died at Cave Spring, Georgia—no date given, but reported on February 7, 1924.

BLACK DUCK, No. 296,070, banded by H. S. Osler, at Lake Scugog, Ontario, on September 4, 1923, was shot near Port Deposit, Maryland, on December 28, 1923.

BLACK DUCK, No. 296,073, banded by H. S. Osler, at Lake Scugog, Ontario, on September 4, 1923, was shot in the Long Point Marsh, Lake Erie, on October 30, 1923.

BLACK DUCK, No. 296,079, banded by H. S. Osler, at Lake Scugog, Ontario, on September 4, 1923, was killed on the Ohio River, near Tolu, Kentucky—no date given, but reported on February 18, 1924.

BLACK DUCK, No. 296,083, banded by H. S. Osler, at Lake Scugog, Ontario, on September 6, 1923, was shot at a place two miles east of Wooler, Ontario, on October 22, 1923.

BLACK DUCK, No. 296,086, banded by H. S. Osler, at Lake Scugog, Ontario, on September 6, 1923, was killed in the Ocmulgee River, about two miles north of Hawkinsville, Georgia, on December 15, 1923.

BLACK DUCK, No. 296,088, banded by H. S. Osler, at Lake Scugog, Ontario, on September 6, 1923, was shot at Golden Gate, Illinois, on December 28, 1923.

BLACK DUCK, No. 296,091, banded by H. S. Osler, at Lake Scugog, Ontario, on September 8, 1923, was shot in the County of Durham, Ontario, on September 21, 1923.

BLACK DUCK, No. 296,108, banded by H. S. Osler, at Lake Scugog, Ontario, on September 11, 1923, was shot on a marsh on the Grand River, Ontario—no date given, but reported on October 17, 1923.

BLACK DUCK, No. 296,113, banded by H. S. Osler, at Lake Scugog, Ontario, on September 11, 1923, was killed in the Cameron Marsh, Louisiana, on December 14, 1923.

(Continued in the April issue)

THE HIBERNATION OF THE COLUMBIAN GROUND SQUIRREL

By WILLIAM T. SHAW

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PERHAPS the most arduous task of any mammalian life study is that connected with the search for information regarding the comatose periods of aestivation and hibernation, if such are involved in the life cycle. Well do I remember with what impatience we awaited the summer's disappearance of the Columbian ground squirrels, *Citellus columbianus columbianus*, eager for the chance to go with pick and shovel to search for the facts of aestivation and hibernation. Yet tired, thirsty, and unsuccessful was our return at the end of the day's effort. Where, but a few days past, scores of squirrels literally swarmed the fields, now we found none. Where had they gone? Again they were sought for, and again, and all that autumn and even on into the winter, yet without success. In the spring following they still seemed very abundant. True, we were working against odds, for the badger, the squirrel's natural enemy, was also abroad and where he dug it was too late and where he did not work there seemed to be a good reason for our not trying. We were learning, however, and long before reward came in finding a wild squirrel in aestivation we had formed what proved to be a correct idea of where and how he would likely be when eventually found. Here and there throughout the summer dens we were running across certain moisture-proof jug-shaped cells of surprisingly uniform dimensions which we rightly judged had formerly been used as hibernation cells:

So cleverly did they hide themselves away that it was not until we were beginning the excavation of the twenty-sixth den in the early part of the second season that we found a squirrel in semi-aestivation. This was in early August. They had been in aestivation scarcely ten days and our prize was not quite dormant—only drowsy; yet in this discovery we established the truth of our surmise regarding the hibernation cell. This was a beginning at least. Again we persevered for more data and were partially successful in the third season, but it was not until the winter of 1913-14 that we really achieved results of conclusive value, results told by the accompanying series of pictures.

Fortunately for the completeness of our work, we were not content with these first discoveries but determined to push on with the investigation in search of further data on lines suggested as we

worked and also to secure more photographic material. So it was, with varying success, that we followed the quest of hibernation data for the next five years, digging in all 136 dens and taking careful data on 54 of them.

One wintry morning we started out on our quest. It was almost the last day of the year. The late December sunrise was wintry. About six inches of snow lay upon the ground, more on the north slopes, less on the south. Wild Horse Butte rose up coldly in front of the distant mountains, its black patches of scrub showing sharply against the white. About its dome rested a fleecy fleck of frozen foam-like cloud. The fore landscape bristled with the umbel-stocks of the past summer's yarrow. Beneath the snow, somewhere, we believed, were sleeping squirrels. These were the objects of our quest.

Selecting one of the dens that had been staked out in the summer, we began digging. Soon snow was being scooped away and the thwack of the pick was heard, black earth soon replacing pure snow drifts. This den seemed not to be very fresh, giving signs of associated pocket gopher work. When it was nearly dug out one of the shovels broke through the end of a cell, and with the touches of loose dirt, some age-brown grass collapsed, lightly as breath, from the ceiling of the cell. This being gently lifted there was revealed the mummy form of a little *Citellus* body. True to the instinct of his race, he had gone into the long sleep to pass uninterruptedly into the longer sleep from which no *Citellus* returns. Though he may have been there several years, all was undisturbed, the cell, the galleries, all were as he had left them, even to nose prints in the soft summer earth door of his winter home, pressed clearly and distinctly as if it had been yesterday, and not moldy ages ago, that he had gone to sleep.

Failing in this first attempt, we now turned towards the yellow sunlit south, to a large den with many entrances, on a snow-covered knoll just above the rimrock. The ground was shallow, though it seemed a good four feet through to the out-cropping lava as revealed down the slope, so we began work. The usual east, south, and west trenches, admitting better photographic lighting were being sunk, when, about half an hour after work had begun, we found a squirrel. This one, a female, was in an old, rather decayed nest, of

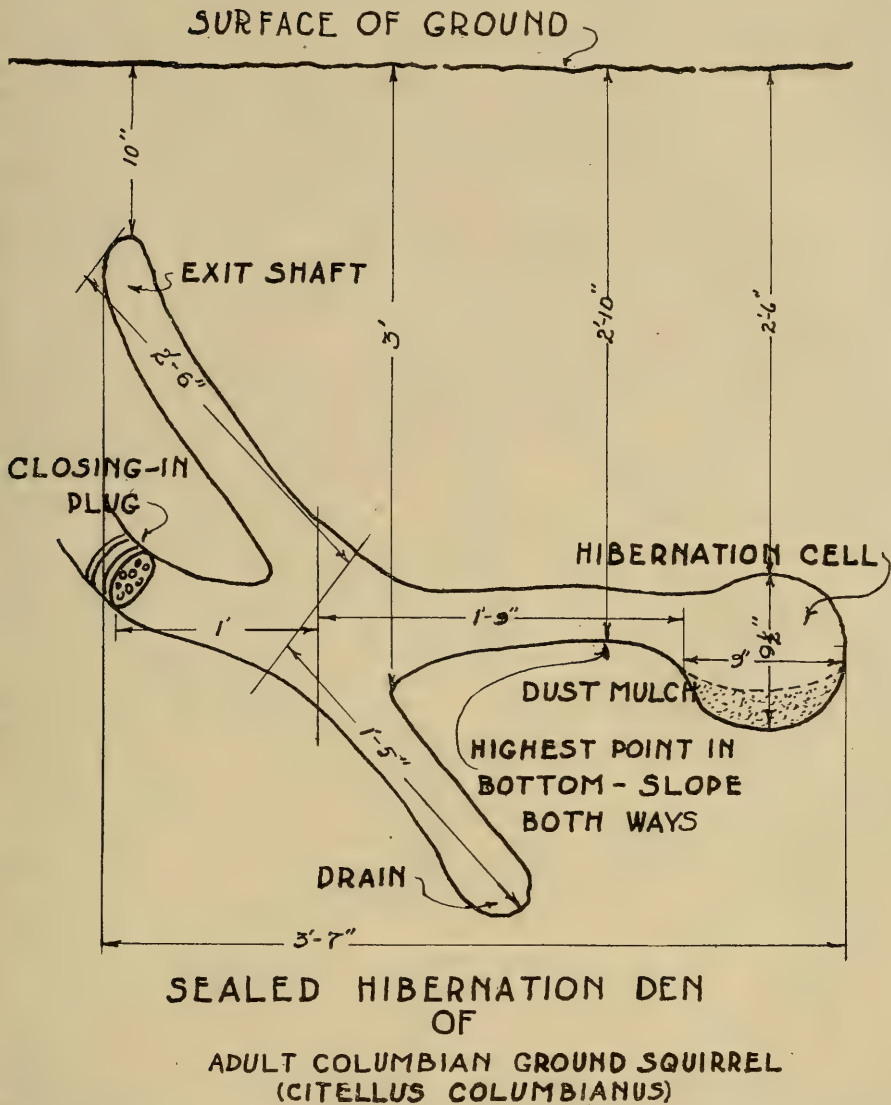


FIGURE 1.—SKETCH OF A HIBERNATION DEN, SEALED FOR HIBERNATION.

This is a sketch of the den shown in the photograph of Figure 2. Measurements and depths are here clearly shown. (Original).

wild grass and considerable fine dirt. She lay in the usual position, with the head and tail towards the entrance of the cell. At once the camera was aimed and a series of photographs was taken, showing her coming out of the hibernating condition. The wind was now high and it was with difficulty that a fire was started in the first excavation, so that dinner might be had and coffee made to add a little comfort to the situation. At two o'clock we returned to the second den to photograph the now awakened squirrel for a final exposure. Examination of the den showed it to be necessary to excavate out its main body in

order to reach the line of focus for the hibernating cell and galleries. In order to do this two of the men began work and had gone only a short distance when Engvall's shovel struck into a cell and pulled out a large amount of dried, rather new-looking grass. Then, to our great surprise, we saw the fur of a second squirrel. The two squirrels were not more than six feet apart; the second was a young female weighing only 275 grams. At first it was feared that she was seriously injured by the shovel but this proved not to be so. Strange to say, she had been a little to one side,

and only a short distance from the fire, yet she was not awakened by it.

A brisk storm of large snow-flakes now blew up from the south-east, with a temperature of about 32 degrees F. and, owing to the failing light, it was decided to remove this second squirrel to the laboratory, a mile or so away.

The find that gave the best results of all was made on one mid-December day. It happened in this way:

At 2.15, Richardson, who was working near the surface, about the center of the den, suddenly cut cleanly through the moist earth with his shovel and uncovered or rather sliced off the top of a large open burrow. The freshness of the newly opened shaft at once attracted our attention. It was smooth-walled and fresh looking and bore no traces of fuzzy sprouting rootlets of wild seeds as seen in most burrows at this time of year, when the earth is moist. The hole was dropping at a sharp angle. It was followed carefully, being opened in sections and was always large and fresh looking. Finally it struck a horizontal burrow almost at right angles. To the left this new shaft was plugged concavely with what appeared to be black soil, which may have come from the vertical shaft. To the right it continued a short distance and branched into a drain running down the main shaft. (Figs. 1 and 2.)

This work of discovery is most fascinating. One feels as a prospector must feel who is looking for gold. Up until the very instant of discovery no one knows for a certainty, yet the signs are extremely inviting. Now, logically, to the right of these shafts should lie the hibernating cell. The strained length of fore arm permitted my extending finger tips to touch, rather uncertainly, a little bit of dry nest material. Would this be the strike? But, the greatest care must be taken to preserve the hibernation den for photographic purposes. One misuse of the shovel might ruin the integrity of the structure. Carefully the workmen shaved away the heavy soil from the location of the cell. At length its upper side wall shelled in, and there, in the little round hole in the nest material lay the fuzzy, gray tail-tip of a soundly hibernating *Citellus columbianus columbianus*. The nest was dry and snugly arched over, though much more matted in the saucer than in the ceiling. The bottom of the nest was made of rather fine grass and some dirt, in which were over one hundred bulbs of the wild onion. This squirrel lay in the nest flatly on his sacrum, as is shown in a photograph taken of him, *in situ*, with his nose tight against his diaphragm and the top of his skull flat in his lap. His tail was towards the entrance of the cell, as is invariably the rule, for in awakening the head is soon drawn out

of the lap, to face the entrance and a possible enemy. Failing light on a cloudy midwinter day made photographing difficult, but we were fortunate in securing one good picture of this squirrel in the hibernation position. (Fig. 3.) This squirrel was an old male and weighed 594 grams.

The following day, at our leisure, we went back to study and photograph this hibernation den. We had discovered it by striking into the exit shaft, a tunnel sometimes constructed at the time of going into aestivation for the purpose of reaching the outer world in the following spring. On awakening for good the animal digs through to the surface of the ground and, when light begins to dawn, pushes his way out, leaving the exit as small as possible, in order that it may be a guard against inclement weather and a possible enemy (Fig. 4), or he may even have to penetrate many inches or even feet of snow. (Fig. 5.)

THE EXIT SHAFT.—The exit shaft is the burrow of the hibernation den leading from the exit to the nest cell. It is sometimes started towards the surface in the previous summer, as will be shown by examining the up-running holes in (Fig. 2, C). It is generally of the same diameter as an ordinary burrow (3.5 inches) and is commonly found to drop at an angle of 45 degrees and, unlike a pocket gopher burrow, is free and open to an average depth of 2 feet, to which depth a long stick or cane may be run freely. The shaft of an open den is usually paved with black surface dirt to a depth of 1 inch, which earth, dug down as the animal came through to the surface, often extends as far as the nest, 4 or 5 feet, and sometimes into and filling the drains. The sides and top of the shaft are rubbed smooth and waxy, especially if the soil is moist. It was found that the average length of this shaft, from the exit to the hibernation cell, for 21 dens measured, was 7 feet, 9 inches. The shortest exit shaft was 1 foot 10 inches and the longest 19 feet 9 inches. The diameter of the burrows of the hibernation den was determined at 3.3 inches. These burrows, comprising the exit shaft and closing-in shaft, often expand into greater diameters where they unite, as is shown in Fig. 2.

Very curiously, on sloping ground they almost always opened the den with the exit shaft pointing down-hill. This would seem to be a precautionary measure against flooding. These shafts were noted coming out on the side of an old potato ridge, to avoid digging through the extra amount of dirt. That this was premeditated would seem true, as shown in the spring of 1914, when nine of these exits were observed in one small tract of land of about six acres, sloping gently to the southwest. All pointed down-hill. Five of them came

TOP

BOTTOM



FIGURE 2.—THE TYPICAL HIBERNATION DEN.

A hibernation den is frequently a part of an ordinary den shut or sealed off from the main den by having all connecting burrows very effectually plugged. It may, however, be quite remotely hidden away from the large summer den. It is securely sealed for the purpose of eluding such natural enemies as the badger and the coyote, and excluding such guests of the den as crickets, mice, pocket gophers, salamanders, toads and tree toads; which are also found in the burrows of the big dens during winter. The hibernation den contains a few feet of open burrow. The illustration shows—on the right, the nest, *A*; running down from the centre, the drain, *B*; to the left of *C*, the closing in plug; running up from *C*, a burrow, which is probably used as an exit in the spring upon awakening, at which time it is complete through to the surface of the ground.

Photo by William T. Shaw

TOP

BOTTOM



FIGURE 3.—A HIBERNATING SQUIRREL.

On December 13, 1913, we discovered a squirrel in absolute torpor. A sectional view of the nest was secured, showing him in the actual position maintained in hibernation. He was photographed exactly as he lay. He was found sitting flatly on his sacrum, tightly curled *vertically*, not horizontally as in the case of a cat or a dog; with the top of his skull flat in his lap. This would seem to be a most uncomfortable position. The animal is able to maintain it on account of the great quantity of firmly packed nest material in which he lies.

He is beginning to revive and has raised himself up a little.

Photo from life by William T. Shaw



FIGURE 4.—THE EXIT.

The squirrel, when he wishes to leave the hibernation cell in the spring, digs his way through the black surface soil to the exterior, finally pushing his way out, as is shown by the waxy edge of the hole. The soil removed is placed in the bottom of the exit burrow, and sometimes a part of it in the drain. This disposal of the soil accounts for the fact that there is no loose dirt whatsoever at the entrance of the exit burrow.

Photo by William T. Shaw



FIGURE 5.—A SNOW EXIT.

The squirrel had evidently just appeared. No tracks led to or from the hole. He had taken a February sunbath, doubtless remaining out a considerable time, as his foot-prints had melted into ice prints in the snow. He was the first in the season to appear.

Photo by William T. Shaw

TOP



BOTTOM

FIGURE 6.—THE HIBERNATION NEST (Vertical Section).

The hibernation nest is made of straw or grass; usually the material nearest at hand, although preference seems to be given to wild bunch grass. The nest in the photograph is as it was left by the squirrel when he came out of hibernation, the earth being carefully cut away from one side.

Photo by William T. Shaw



FIGURE 7.—THE CLOSING-IN PLUG.

This structure placed in the hibernation den as a last act before going into aestivation is tamped in, layer after layer—in this case for over two feet—until the den is securely sealed. (Original).

up either between ridges or on the side of a potato ridge.

THE HIBERNATING CELL.—The hibernation cell itself is the circular cavity in the hibernation den in which the nest is placed and in which the squirrel remains during the time of his comatose condition. In shape it is almost a perfect sphere (Fig. 8).

The average size in inches of 42 of these hibernation cells was:

Height, 8.4; front to back, 8.8; width, 8.3.

The smallest hibernation cell measured:

Height, 5.5; front to back, 6.25; width, 5.25.

This den contained a small female weighing 275 grams.

The largest hibernation cell measured:

Height, 11; front to back, 10.5; width 11 inches.

From this den a large male weighing 615 grams was taken.

THE NECK OF THE HIBERNATION CELL.—The neck of the hibernation cell is the short burrow connecting the cell with the other burrows of the den. It is usually of the same diameter as the other burrows, 3.5 inches, and of varying lengths.

It generally leads up towards the cell, which would seem a provision against flooding (Figs. 1, 8).

During the entire study twenty-one measurements were taken of the necks of hibernation cells, resulting in giving, as the average length of the neck of the cell, 4.3 inches. The shortest being practically no neck, and the longest being 21 inches.

THE SAUCER.—In the bottom of each cell was a dish or saucer of varying depths. This depression, which was simply the lower part of the curved surface of the cell, holds a dust mulch upon which the soft inner material of the nest rests. This mulch protects the animal from moisture (Fig. 1).

In the saucers of 17 hibernation cells measured the average depth was 2 inches, the shallowest .7 inches and the deepest 3.5 inches.

THE DRAIN.—One of the most remarkable structures of the hibernation den is the drain, shown typically in Fig. 1, 6. It is undoubtedly constructed for the purpose of keeping water from entering the nest, and is frequently omitted, as a special structure, when the den is on a side hill where drainage is met in another way.

The average length of the drain of 21 hibernation dens measured was 3 feet 5 inches, the shortest 7 inches and the longest 7 feet 9 inches. The average depth from the surface of the ground to the deepest point of the drain of 24 dens measured was 4 feet 1 inch. The deepest drain was 5 feet 6 inches and the shallowest, 2 feet 4 inches. In this latter case, the den was on thin soil, only 35 inches to rock. The diameter of the burrow was 3.5 inches to expansions of 5, 7, and 9 inches.

Another function for the drain, aside from the protection afforded against moisture, is in the use to which it is sometimes put as a place into which the dirt from the exit shaft is packed. Frequently we find this earth in the drain after the squirrel has opened his den. It is also found in the bottom of the exit shaft.

THE CLOSING-IN PLUG.—By the closing-in plug we mean a plug of earth several inches long placed in the burrow leading to the outside at the time of going into æstivation. The plug is made of earth probably taken from the drain and tamped firmly into place by the squirrel, using his nose in the operation.

When ready for æstivation the squirrel closed its den against all intruders found inhabiting its summer den during the winter, such as crickets, spiders, salamanders, toads, pocket gophers and cottontails. This is done with the closing-in plug and must of necessity be done from the inside of the hibernation den, as a last act. This plug was first noted in the closed hibernation den, as in Fig. 7. It was noticed then that it was made of new dry earth, of late summer, the nose

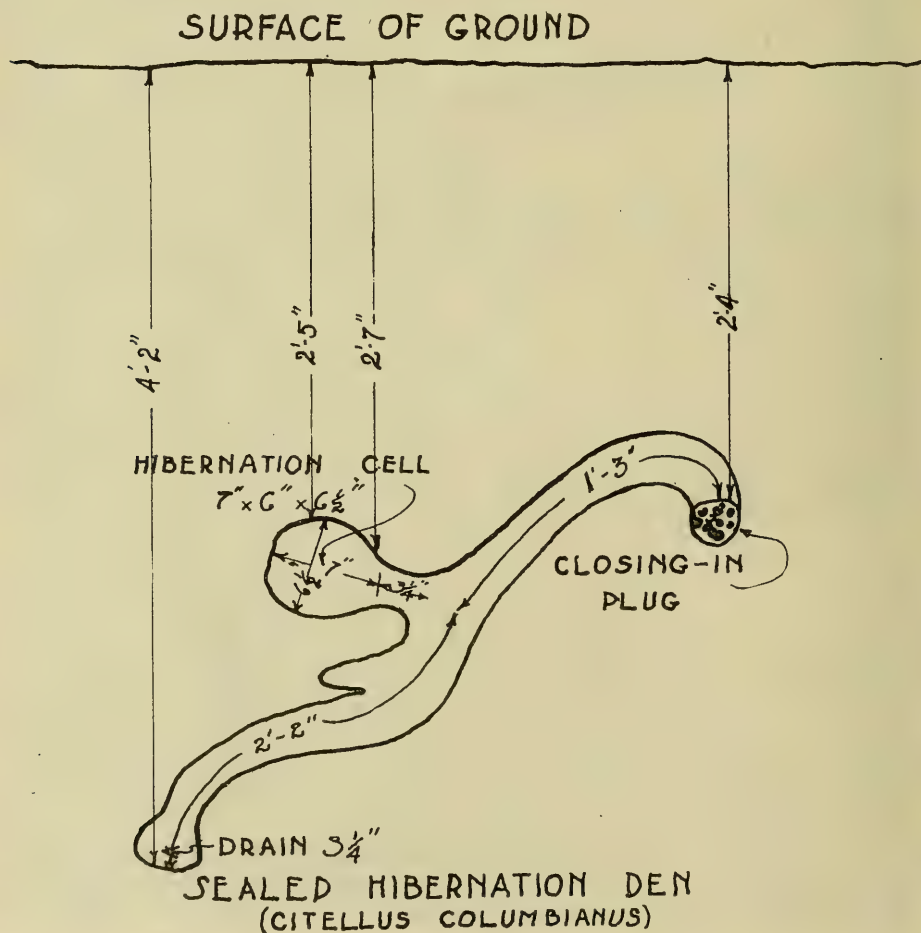


FIGURE 8.—A CLOSED HIBERNATION DEN.

This is the den shown in photograph in Figure 9, showing the relative depths of the cell and drain. (Original).

prints being much less distinct than they were in plugs made of moist earth of spring.

An interesting speculation has suggested itself as to how and where the squirrel gets the earth with which to plug the hole after it is inside the hibernation den. In the first place the hole is plugged from the inside, as is shown by the curves in the saucers, concave inside. Then the squirrel must have the nest inside before it closes the hole. The only place for it to come from is the drain or the beginning of the exit shaft. In the drain it gets damper soil than it would by digging higher up, and this soil would pack better. In the majority of cases of dens examined we have found that the earth found in the closing-in plug had been taken from the drain, as the soil was the same.

The question naturally arises, do they inhabit the same cell year after year? If so, they must enlarge the length of the drain or dig new branches

in the drain or else resort to plugging in some form, or use the black dirt thrown in the drain from the exit burrow. This would give us a vague idea as to the age of the den. Of course, in the case of a young squirrel's den, in which the drain is already provided, the earth for closing the entrance must be taken from some other part of the old reconstructed summer den.

On July 24, a large squirrel which had been trapped recently and enclosed in one of the cages of the hibernation cellar in the hibernation cabin showed indications of following his wild instinct by stopping up the cracks in his box as if getting ready to go into æstivation. This was commonly done by the Townsend squirrels in captivity. Not only would they close the entrance and all cracks for hibernation, but very frequently they would close the door to their box each night, during the periods of activity.

(To be concluded)

IN MEMORIAM

CHARLES EUSEBE DIONNE

Born July 11, 1845 Died January 25, 1925

In the death of C. E. Dionne, which occurred on January 25, 1925, the world of natural science lost one of its finest personalities. Almost unknown, and humble as all true scientists are, he progressed and became, by dint of effort, perseverance and courage, one of the leading ornithologists of his country.

His death is a severe loss to scientific societies and to sportsmen, but especially to Laval University, where his place will be difficult to fill.

Charles Eusebe Dionne, son of Pascal Eusebe Dionne and Emilie (Lavoie) Dionne, was born on July 11, 1845, at St. Denis, Kamouraska County, Quebec. His father was a farmer of limited means.

As a boy he attended, not too regularly, the parochial school at St. Denis, until he reached the age of 11. When very young, he loved to wander through woods and fields and along the shores; his interest in things relating to natural history, such as plants, insects, and birds, was being developed through contact with nature itself. He was especially attracted by groves and by a certain swamp behind his father's house, in which he used to see the Maryland Yellow-throat, a bird which particularly attracted his attention as a beginner.

When he left school, he remained on the paternal farm till he reached the age of 15. A little later he went to school again for two different periods,

totalling thirteen months. The teacher, Mr. Guillaume Robichaud, taught a special class of two pupils, to which, as a favor, young Dionne was admitted, but as a listener only, he not being given the right to put any questions. Soon, however, the teacher noticed his application as well as his eager desire for learning, so that he treated him just as he did the other pupils. His progress was so remarkable that one day Mr. Robichaud, referring to him, said, "See young Dionne; he has learned in thirteen months what most of the others require four years to learn."

This special class furnished him an opportunity of seeing for the first time a treatise on natural history. Having seen the coveted book on a shelf and being too timid to ask for it, he had recourse to a stratagem to snatch it, study it, and replace it as it was. Shortly afterward, the teacher, having discovered his doings, amicably reproached him for his timidity and placed the book at his disposal. Dionne read and reread the volume and copied all the figures therefrom.

One of his brothers was an employee at the Quebec Seminary and Charles decided to join him and on January 19, 1865, he was appointed a campus employee at a salary of \$4.00 per month plus room and board with the students. But after the fire of March, 1865, he was given work in the kitchen.

There was then a museum at Laval University (closely associated with the Seminary), but rigid

rules forbade all employees to enter it. Young Dionne did not even know that it existed.

In September, 1866, he was appointed apparitor in the Faculty of Law of Laval University and was also given work in the library. In such proximity to the museum Dionne became aware of its existence. He also began his botanical studies by means of books from the library. His first author was Buffon. The following year saw the beginning of his collection of birds. His collection of insects was also commenced about that time, with the encouragement and advice of Mgr. Hamel.

The only time which he could devote to his study and the work of forming his collections was that after the close of his day's work as an employee and what he could spare at lunch time and he almost had to hide to use even these hours in his favorite way, for fear of ridicule from his fellow-employees.

The Rector, Mgr. Hamel, took much interest in his studies and would periodically come and chat with him, observe his progress and encourage him. Abbé Laverdiere, just before he died, strongly recommended that the authorities of the Seminary should help young Dionne and facilitate his studies by giving him the necessary freedom of action.

About 1867, he attended an evening course of instruction given by Mr. Cloutier at the old Normal School. He found it difficult at first to obtain permission, as this class ended too late in the evening to allow him to return to the Seminary building before the closing of the doors at 8.45 p.m. Far from being discouraged by the Proctor's refusals, he submitted his request to the Rector, Abbé (later Cardinal) Taschereau, who not only granted his wish, but gave orders that a door should be left open every night until his return. The following year he was able to continue his evening course at the Brothers' Academy, under the direction of Abbé (later Mgr.) Gauvreau.

On May 6, 1876, he married Marie Emilie Pelletier.

In 1882 he was appointed Curator of the Museum of Laval University. At that date the Museum contained but a small fraction of its present wealth, and most of the specimens in it were neither named nor classified. Mr. Dionne's first ambition was to establish order. Single-handed, he accomplished this task so well that it will always remain the most worthy monument to his memory; a monument full of precious lessons for the information of generations to come. The board of directors of that period had truly made a happy choice in appointing Mr. Dionne as Curator.

All of Mr. Dionne's outings were devoted to collecting; he would visit the woods in the vicinity

of Quebec, such as those at Sillery, Charlesbourg, and around Chateau Bigot, as well as the shores at St. Denis, Riviere Ouelle, and Chateau Richer. Unfortunately, the time at his disposal was very limited and holidays were few. A determination such as his, coupled with a decided love of his work, alone explains his persistence in following his favorite studies notwithstanding the difficulties imposed by chance and circumstances. "In spite of that", he would say, a short time before his death, "if I were to start all over again, and if I saw in advance all the obstacles which I had to conquer, I would not hesitate to choose the same path."

In 1889 he collected at St. Denis specimens of the Acadian Sharp-tailed Sparrow (*Passerherbulus nelsoni subvirgatus*), which had recently been described by Dr. Jonathan Dwight, Jr., of New York, from specimens obtained in the Maritime Provinces. Soon afterward Mr. Dionne published his records of this bird in his *Catalogue annoté des oiseaux de la Province de Québec*. Some time later Dr. Dwight, who had read this publication, sought for the Sparrow in question in various marshes along the St. Lawrence (but not at St. Denis) but without success.* So he went incognito to see Mr. Dionne and questioned him concerning the bird. This disclosed his identity, since no one but Dr. Dwight could put such questions. Mr. Dionne's specimens were therefore shown and his identification confirmed. Dr. Dwight has held him in high esteem ever since.

Mr. Dionne learned taxidermy from books, but, as a result of his constant striving for improvement and his observation of nature itself, he found methods that were often more efficient and practical than those previously employed.

In spite of a great loss sustained in a fire in 1917, Mr. Dionne's private collections are very valuable. Space does not permit of mentioning them in detail here, but they include, besides birds and mammals, butterflies and other insects, as well as a herbarium.

Mr. Dionne's main travels are the following:

In 1882 he was invited to take part in an expedition to the lower St. Lawrence on board the *Druid* in company with Mr. J. U. Gregory, an agent for the Canadian Department of Marine. The object of the excursion was to make certain studies and observations on game.

He went to Chicago in 1893 and attended the opening of the Field Museum. In 1900 he visited the American Museum of Natural History, at New York. During a trip to Europe in 1912 he visited the Jardin des Plantes, the Musée d'Histoire Naturelle and the Musée d'Anatomie, at Paris, and the British Museum, at London.

*Dr. Dwight states that he obtained specimens at Rivière-du-Loup, about 31 miles down stream from St. Denis.—Editor.

Besides various scattered notes and articles in scientific periodicals he published the following works: *Les Oiseaux du Canada*, *Catalogue Annoté des Oiseaux de la Province de Québec*, *Les Mammifères de la Province de Québec*, *Les Oiseaux de la Province de Québec*, *Les Araignées*. All of these works are recognized authorities in their respective fields.

A Master of Arts, he was made a Doctor of Science a few days before his death, at the completion of sixty years spent by him in the service of Laval University. He was a member of the National Geographic Society and had been an Associate of the American Ornithologists' Union since 1893. He was one of the founders of the Provancher Society of Natural History.

His field of action was not limited to the fauna

of his own country; in fact, he made, with scientists of all countries, thousands of exchanges of specimens of insects, bird skins, and plants, thus helping greatly to make our national treasures of natural history known in foreign lands.

An amateur inquiring for information or bringing specimens for his inspection was sure to receive every possible assistance, given in the kindest and most gracious manner. In this excellent fashion Mr. Dionne popularized natural history among the people of his province.

Dr. C. E. Dionne was assuredly not a closet-naturalist and his knowledge was not merely book knowledge, for he studied from nature's great open book.—D. A. D.

(The above memorial notice was furnished by the Provancher Society of Natural History.)

NOTES AND OBSERVATIONS

A DISTRIBUTIONAL RECORD FOR BREWER'S BLACKBIRD (*Euphagus cyanocephalus*).—Recently a specimen of Brewer's Blackbird (*Euphagus cyanocephalus*) was presented to the Royal Ontario Museum of Zoology by Mrs. Mundy, formerly of Toronto, who had recently returned from the north, where her husband was stationed with the Royal Canadian Mounted Police. The specimen was shot at Baker Lake, Provisional District of Keewatin. Baker Lake lies about at the intersection of 64° N. latitude and 96° W. longitude, up Chesterfield Inlet from Hudson Bay.

The northern and northeastern boundaries of the range of *Euphagus cyanocephalus* are described in the 1910 edition of the A.O.U. *Check-List* as follows: Western North America. Breeds from British Columbia, Athabasca Landing, Alberta, and southwestern Keewatin. . . . The present record is about 600 miles north by east of this delineation.

The information accompanying the specimen states that the bird was shot in November, 1923. The natives, speaking in a way to suggest that they knew the species, informed Mrs. Mundy that this bird was a female. The coloration, however, is that of a male.

From the information at hand it is impossible to judge as to the frequency of occurrence of Brewer's Blackbird in this area.—L. L. SNYDER.

THE RECORDING OF ACCLIMATIZATION EXPERIMENTS.—For many years individuals, associations of one kind or another, and Departments of Governments have brought into Canada from elsewhere, or transferred from one part of Canada to another, various kinds of mammals, birds, and other living things, thus making possible permanent changes in fauna and flora should the newly-

placed living creature happen to succeed in its new environment. The history of such acclimatization experiments is well known in some instances, as, for example, those of the House Sparrow and the Starling, and the recording of the effects of these birds on other life, and of their success in this continent still goes on. More often than not the details of experiments of this kind have not been published at all, or else they have been recorded in such a way that they are not permanently available to naturalists and others who might be interested in them, and who might profit by the experience gained in each such experiment. In addition to publicity that is given to acclimatization experiments through the daily press and through Government reports it is thought to be desirable to have a brief report of each experiment, whether successful or otherwise, published in a Natural History Periodical, where the account will be permanently available to naturalists who are concerned, or who may be concerned in the future.

The Ottawa Field-Naturalists' Club gave attention to this subject recently and, as a result, each Provincial Game Department received a communication from the Club in which the importance of such records of acclimatization was discussed, and in which attention was called to the publication of the Club as being available for recording important acclimatization incidents. For those who may not be familiar with reporting items of this kind I would suggest that Mr. F. Bradshaw's article entitled *The Hungarian or European Grey Partridge* which will be found in *The Canadian Field-Naturalist* for May, 1922, Vol. XXXVI, pp. 91-2 be used as a model. In reporting each introduction the date should be recorded as being of very special importance.

For my part I propose recording at once as many of these acclimatization experiments relating to mammals and birds as possible. If anyone has unpublished data on the subject, I would suggest that they be prepared for publication in *The Naturalist*. The history of some species which may become acclimated in the country, or in some new part of it, may be incomplete without the data that may be available now, but lost tomorrow.

The question of recording acclimatization data in other fields is worthy of the attention of botanists, ichthyologists, herpetologists, entomologists, foresters, and others, in my humble opinion, although, naturally, they may have done much more along these lines than I know.—HOYES LLOYD.

RECORD OF THE SOOTY TERN FOR NOVA SCOTIA.—The hurricane of the 26th of August, 1924, was responsible for a number of rare and unusual occurrences along the coast of Nova Scotia. On the 28th, at a point several miles inland from the Bay of Fundy and near the town of Wolfville,

King's County, a beautiful specimen of the Sooty Tern (*Sterna fuscata*) was picked up dead and brought to the writer, in the flesh. On examination this proved to be a female and was much emaciated, apparently having died from starvation.

The bird was mounted and subsequently presented to the Curator of the Provincial Museum at Halifax. As far as can be determined this is the first record of the Sooty Tern for Canada.—R. W. TUFTS.

AN OBSERVATION OF WINTER CROWS.—While skiing on the Rideau Canal near Hog's Back, in the vicinity of Ottawa, on January 18, 1925, I witnessed what I considered to be a very unusual sight at that season—a long flight of Crows. This flight passed in a westerly direction for at least an hour and consisted, I judged, of many hundreds of birds. The Crows flew in an irregular, straggling line, containing groups, large and small, as well as single birds. One group consisted of 47 birds.—PEARL MCGAHEY.

BOOK REVIEW

MUSEUM GUIDES

GENERAL GUIDE TO THE HALL OF PALAEOLOGY, NATIONAL MUSEUM OF CANADA, *Ottawa, 1924.*

A FOSSIL FLOWER: by B. E. Dahlgren, *Field Museum of Natural History, Department of Botany, Leaflet Number 5, Chicago, 1924.*

Guide books to natural history museums might be roughly classified into two groups—those written for the use of the man in the street, and those planned for the instruction and guidance of the student and the scientific specialist. The elaborate and excellent guide books issued by the British Museum represent the latter type at the high-water mark of excellence.

A typical example of the primer type of museum guide has recently appeared under the caption of *General Guide to the Hall of Palaeontology, National Museum of Canada*. The size and scope of this little three-page folded leaflet adapt it to free distribution. The author has evidently had in mind while writing this leaflet guide the 98 per cent of museum visitors who could not even give an intelligent definition of the word Palaeontology. A generalized section of the earth's crust with the nomenclature which a century and a half of earth study has developed for its subdivisions is shown on one side of the folded leaflet. The other side presents some of the simpler concepts of stratigraphic palaeontology and refers briefly to the significance of the more important exhibits in the hall.

It is refreshing to see a return on this little guide

book to the use of the name National Museum in place of Victoria Memorial Museum—the name of the building in which the National Museum collections are housed. The need of a National Museum in Ottawa as in other capitals was urged in a half-page article in *The Citizen* as long ago as 1883. The frequent use of Victoria Memorial Museum as the official title of the Museum has led to numerous misconceptions on the part of the public concerning the status of the National Museum. This unfortunate name has helped greatly to conceal from the people of Canada the fact that the museum in Ottawa belongs to and represents the whole of Canada in the same sense that the British Museum represents Great Britain and the U.S. National Museum the United States.

A museum guide booklet recently published by the Field Museum, Chicago, displays a happy solution of the difficult problem of conveying to the general public in an entertaining way much important palaeobotanical information without becoming too technical to frighten away the lay reader.

A *Fossil Flower* is the arresting title which appears on the cover of this booklet. Fossil flowers are even more rare than the forests of "solid stone, so hard that they shivered to pieces the finest-tempered axes . . ." which Sinbad and his companion encountered according to The Thousand-and-second Tale of Scheherazade. So many a browsing reader will no doubt feel constrained to read the pages with this unusual label.

We learn from this very handsomely printed booklet that flowers, in which even the pollen grains are perfectly preserved, have been found in the beautifully fossilized cycads which occur in the Black Hills of South Dakota. The area where the finest of the flower-bearing cycads have been found has recently been set aside by an act of the United States Government establishing the Cycad National Monument. It is due primarily to the foresight and initiative of Dr. Wieland, of Yale University, that this very remarkable locality has been made safe for posterity. His intensive study of the splendidly preserved cycad trunks resulted in the discovery of the perfect flowers which some of them enclose. Cycad flowers were probably blooming on the edge of the Dakota deserts away back in the days when the dinosaurs now exhibited in the National Museum at Ottawa were wading about in the marshes of central Alberta.

These oldest known flowers are preserved in the sides of curious globular or bulbous thick-stemmed fossils which are known to miners and quarry workmen as fossil hives, wasps' nests, or crows' nests. They are related to the sago palms now living in the tropics. Excellent illustrations of the curious branched stamens of the models of the fossil cycad flowers in the Field Museum of Natural History embellish the pages of this instructive little booklet, which admirably presents in brief form some of the more essential facts about fossil cycads.—E. M. K.

THE CULTIVATION OF NEW ZEALAND PLANTS.—

By L. Cockayne, Ph.D., F.L.S., F.N.Z. Inst., F.R.S., Hon. Botanist State Forest Service, N.Z.; Corresponding Member Horticultural Society of Massachusetts, U.S.A.; Author of "New Zealand Plants and Their Story", "The Vegetation of New Zealand", etc. (Whitcombe & Tombs Ltd., Auckland, Christchurch, Dunedin and Wellington, N.Z.; Melbourne and London). Price 4/6.

Dr. L. Cockayne has given, in a very concise and instructive form, the result of his personal experience of thirty-five years in the cultivation of the native plants of New Zealand. The number of plants treated exceeds eight hundred. The "habitat" or place of dwelling, as Dr. Cockayne calls it, has been given special attention. There are twenty-four well-reproduced photographs; a map, and, as frontispiece, a beautiful reproduction of the Crimson Manuka (*Leptospermum scoparium* var. *Nichollsii*).

The book deals with the methods of procuring and cultivating the plants; and has chapters on trees, shrubs, herbs and climbing plants suitable for gardens, as well as on ferns for the open garden, on plants for decorating the home, native

plants for school grounds and children's gardens, and native plants for town gardening.

Dr. Cockayne is to be congratulated on the delightfully interesting way in which he has presented a wealth of valuable first-hand information and Messrs. Whitcombe & Tombs for putting out the book in such good form at a price that will commend itself to the public.

There are three short paragraphs that I should like to quote from the author's introduction:

"Though the wild New Zealand plants live in all kinds of situations, and thrive under conditions unknown in gardens, it must not be thought that the majority are not amenable to cultivation. Quite the contrary is the case; by far the greater number yield to the gardeners' skill; only a small minority refuse to change their abode. Yet there is a deep-seated conviction to the contrary, notwithstanding the fact, as will be seen, that many species have been cultivated for years.

"New Zealanders, as a whole, love their plants. The bush is a delight to thousands, with its multitude of ferns, its stately trees with ropes of lianas depending from their massive boughs, its white clematis, and its scarlet ratas. So, too, the lovely alpine flowers are a joy to those more venturesome who climb the lofty mountains. In short, many would willingly cultivate the plants of their country, but they are deterred by the reputed difficulty.

"Nor is this all, our flower-gardening is, in large measure, an imitation of that of the Motherland, although here the capabilities for open-air horticulture are far wider, and plant after plant, not hardy in Great Britain, can be readily grown. Thus our gardens should surely possess a peculiar stamp of their own, and a national horticulture come into being, with not only a rich exotic garden flora, but one where New Zealand plants themselves would play no inconsiderable part."

The writer of this review has the pleasure of knowing the stimulating and vital personality of the author of this book, and can only wish that Canada may develop a Cockayne to exploit and extol the possibilities of her native plants, many of which are equally as beautiful and interesting as those of the sister Dominion of the South.—R. B. T.

THE MASCOUTENS OR PRAIRIE POTAWATOMI INDIANS, Part 1, Social Life and Ceremonies, by Alanson Skinner. Bulletin of the Public Museum of the City of Milwaukee, Vol. 6, Pp. 1-262, Plates 1-8, Figs. 1-2. Nov. 10, 1924, Milwaukee, Wis. Price \$2.00.

It is unfortunate that the first impression of this

book should be one of wonder and dismay. The author has jumped at once *in medias res* and carries the reader quite off his feet. In the introductory chapter he writes of so many things other than his subject and draws so many comparisons that the general reader, unacquainted with the ethnology of the Central Algonkian peoples, can gain but little information. In the first place it is very difficult to gather from the text where the Mascoutens live or lived. It is only by rather laborious investigation that one discovers that these people are to be found at present on a reservation at Mayetta, Kansas, in central Oklahoma, at Arpin, Wisconsin, and in Old Mexico.

One paragraph in the introduction is, however, of interest, as it gives us some light upon the origin of the Mascoutens. It runs as follows:

"All the tribes in question (the Potawatomi?) have many traits of ethnology, and some even of actual tradition linking them with the Algonkians of the Middle Atlantic, and even of the New England sea-coast. The Mascoutens are not lacking in this respect. They tell us in their legends that they came into the world near the sea, and close to the habitations of their 'Grandfathers, the Delawares'. Their religion, no matter how disguised, still harks back to those archaic eastern Algonkian manitous, Fire, Water, and the Sea, with the gods of the four cardinal points and the great controlling deity, the Great Spirit."

The bulk of the volume is taken up with descriptions of social rites, with lists of social groups, and with the myths of origin of the various clans and functions found in the social organization of the Mascouten people. It is noticeable that the accounts of ceremonies and the translations of myths are rendered in a very free and pleasing manner. The usual constant repetition of native words is entirely absent, and this makes the body of the book pleasant and easy to read. Any outline of the material in the text would be a rather lengthy undertaking and would, moreover, be unintelligible except to students of ethnology.

The whole book is a work of reference and as such it is obviously useful, but for the general reader it is rather too special and not explicit enough. Another notable feature is the absence of any conclusion. The last sentence is part of the description of a ceremony. This leaves the reader wondering if the author has formed no conclusions from his research or whether he is reserving their presentation for the conclusion of the whole series, for the sub-title tells us that this is only the first volume of a number.

As a piece of bookmaking, the volume comes up to the high standard of the Milwaukee Museum publications, both in the typography and in the excellence of the illustrations.—G. E. R.

THE AUK, 1924

This volume opens with an important article—
A CONTRIBUTION TO THE LIFE HISTORY AND ECONOMIC STATUS OF THE SCREECH OWL (*Otus Asio*). By A. A. Allen, plates I-V, pp. 1-16.

This provides much food for thought for conservationists of both the "hands-off" and the "vermin-control" schools. In June-July, 1921, at Ithaca, New York, Dr. Allen made a detailed and accurate study of the food consumed by a brood of Screech Owls during the final six weeks of their nest life. The results are rather surprising to those who advocate the leaving of nature to find its own balance, irrespective of where the level may come. During this six weeks 77 small birds, not predominantly juveniles, were known to have been brought to the young and the debris in the nest hole produced recognizable remains of many more from previous feedings. The total score for this brood was at least one hundred birds, and probably substantially more. The amount of insect, small mammal and other food was insignificant and could in no way compensate for the destruction of the insectivorous birds consumed.

Even more surprising than the unexpected harmfulness of these birds was the small apparent effect it had on the local resident bird life. Though it is assumed that most of the birds were taken in or near the small four-acre home grounds sanctuary, the bird population within it was not reduced appreciably. The 42 nesting pairs of birds in this area were all known and watched. Often one of a pair would be missing coincidentally with the appearance of a similar bird in the Owls' menu, but new mates usually took the places of such birds almost immediately. Indeed it seems as if there were an abundance of unattached birds ready for just such opportunities. Unless the second parent disappeared before it could remate, the semi-orphaned brood had very good chances for survival. A census of the sanctuary the following year showed a slight increase in bird population rather than a decrease, in spite of the fact that a number of birds in excess of the whole adult population of the area was known to have been eaten.

The conclusions which may be drawn from this evidence are conflicting, but a great doubt is raised as to the expediency of permitting Screech Owls in areas where other birds are especially desired.

CRITERIA FOR THE DETERMINATION OF SUBSPECIES IN SYSTEMATIC ORNITHOLOGY. By Frank M. Chapman, pp. 17-18.

Dr. Chapman acknowledges the propriety of the use of intergradation as a test for subspecific status but advocates freedom in the application of

the principle; and urges that in cases where intergradation is difficult or impossible to demonstrate, collateral evidence should be used and each case treated according to its own merits. This is a proposal that we heartily approve.

DIVING OF GREBES AND LOONS. *By Chas. W. Townsend, pp. 29-41.*

Apropos of a paper on the use of wings and feet under water, Dr. Townsend collects an amount of evidence and concludes that the use of feet alone is the most efficient method of avian submarine propulsion, and that the use of both wings and feet is a primitive method of progression and still indulged in by young birds and by old ones when frightened or wounded.

THE FORTY-FIRST STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION. *By T. S. Palmer, pp. 122-134.*

The meeting was held at Cambridge, Mass., October 8-12, 1923. There was a good attendance and an interesting programme of papers was presented. Four representatives from Canada, three Fellows and one Associate, were present. J. H. Fleming, of Toronto, was elected to the Council. Dr. Chas. W. Townsend, well known to the readers of *The Naturalist*, was elected to the single vacant Fellowship. 173 Associates were elected.

THE SONGS OF LEACH'S PETREL. *By Chas. W. Townsend, pp. 148-149.*

A description of the weird night song of the species as heard near Grand Manan, New Brunswick, July and August, 1923.

NOTE ON THE CORMORANT (*Phalacrocorax carbo*). *By Chas. W. Townsend, p. 150.*

Reporting the occurrence of this species near Grand Manan, New Brunswick, in the winter of 1923, and the supposition that it breeds nearby. On a trip to the vicinity in question, on July 25, 1923, Common Cormorants were recognized among individuals of undeterminable species, but no nests were found.

LEWIS'S WOODPECKER VISITS CHICAGO. *By Ashley Hine, pp. 156-157.*

Mr. Hine, late of Edmonton, Alta., now of the Field Museum, Chicago, reports the occurrence of this western species at Chicago.

FURTHER NOTES ON THE STARLING IN CANADA. *By Henry Mousley, pp. 158-159.*

Referring to Harrison Lewis's record of the Starling on the Canadian Labrador coast and adding data on late occurrence near Hatley, P.Q. The Starling is evidently firmly established in Canada now.

THE LARK SPARROW (*Chondestes g. grammacus*) IN NEW BRUNSWICK. *By Chas. W. Townsend, p. 160.*

Recording the capture of a specimen on Grand

Manan, New Brunswick, August 13, 1923; and its deposition in the Victoria Memorial Museum, Ottawa.

Under *Recent Literature* we note—

A PRELIMINARY SURVEY OF THE BIRD LIFE OF NORTH DAKOTA. *By Norman A. Wood, University of Michigan, Museum of Zoology, Miscellaneous Publication No. 10, Ann Arbor, Mich., July 2, 1923.*

A well annotated and careful list of 96 pages. This should be of interest and value to ornithological observers in adjoining parts of Manitoba and Saskatchewan.

LOCAL NAMES OF MIGRATORY GAME BIRDS. *By W. L. McAtee, U.S. Dept. of Agriculture, Miscellaneous Circular No. 13. October 13, 1923. pp. 1-95, with 52 text figures. Price 20 cents. Supt. Documents, Govt. Printing Office, Washington, D.C.*

This is interesting as showing how many and what strange names have been applied to various birds of interest to the sportsman. It is a conclusive argument for the necessity of scientific and officially accepted common names.

NOTES ON SPRING BIRD MIGRATION OF 1914 AT ANTIGONISH, NOVA SCOTIA. *By Harrison F. Lewis. Trans. N.S. Inst. Science. XV, Part 2, pp. 119-128. June 30, 1923.*

An annotated list of larger scope than its title indicates, by our own chief editor.

A COLLECTING EXPEDITION TO BONAVENTURE ISLAND, QUEBEC. *By George Shroobree. Year-book Milwaukee Public Museum, 1922, pp. 22-41.*

A beautifully illustrated popular account.

THE DESTRUCTION OF WATERFOWL IN THE WEST. *By Allan Brooks. American Forestry, October, 1923.*

An account of the deadly conditions on some of the alkaline lakes of the west, illustrated by photographs.

Wm. C. Adams, Director, Division of Fisheries and Game, Massachusetts Department of Conservation, writes a letter in comment on and approval of Dr. A. K. Fisher's Statement Regarding Scientific Collecting in the July issue of the *Bulletin of the American Game Protective and Propagation Association*. The subject is very important both from the standpoint of the development of science and from that of its practical application to conservation. It is the latter aspect that the writer stresses. It would be well if this letter could be given wide circulation and had we space we would quote it liberally. Mr. Adams recognizes the importance of scientific information as a basis for measures of protection and conservation and the necessity for the collecting of specimens in obtaining it. He deplores the fact

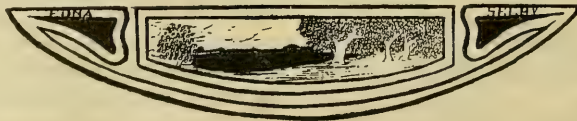
that enough naturalists are not being trained and that obstacles are thrown in the way of their development by certain short-sighted protection policies.

His criticism of the ornithologist is not that he collects specimens but that he has not generally worked in closer contact with regular game commissions and authorities. In this we think Mr. Adams is confusing cause and effect. The reason for the lack of co-ordination between naturalist and game warden has usually been the disregard by the latter for the information the former had to offer. Game guardianships have been filled many times by men of good intentions, but it has been seldom that such appointees have had any special knowledge of the animals they were endeavoring to protect or realized that the naturalist had anything of value to offer. The naturalist, especially the ornithologist, has been more often the object of persecution by game officials than of encouragement. It is certain that once regularly constituted game protection authorities show a desire for exact information the naturalist is willing to assist, as has been demonstrated wherever that enlightened policy has been followed. Today, the biggest and most successful influences for the protection of wild life, such as the Audubon Societies, the United States Biological Survey, the various anti-millinery plumage bills; the international Migratory Birds Convention, and others have been conceived and inaugurated by the specimen-collecting ornithologist. Mr. Adams makes a plea for scientific assistance in studying the cause or causes of the periodic rise and fall in abundance of the Grouse. It may be said that in response to or coincident with this appeal two such investigations are being undertaken under able scientific ornithological direction. One in the State of New York with the Ruffed Grouse as the object of study; the other in Florida for the study of the Bob-White. When results are obtained, they will probably be of great value to the whole country, where similar problems have to be faced without exact data for their solution.

An editorial on p. 202 discusses a campaign recently inaugurated against the Crow by a well known powder company. The Editor is strongly condemnatory. Whether it is wise to entrust vermin control to commercial concerns or whether it is expedient to encourage irresponsible persons to carry guns in the field during the close seasons with the ostensible excuse of killing Crows is

largely a question of administrative policy. That the Crow has increased in some localities so as to introduce a serious factor against the welfare of resident species can hardly be doubted. That the guardedly approving findings of a recent investigation of the economic influence of the Crow disregard entirely its egg-eating activities is admitted. That as a species it is well able to take care of itself and is in not the slightest danger of extermination under even the persistent persecution practiced is evident. It is our view that there are many places where the number of Crows can be greatly reduced with benefit to the community but we are equally uncertain as to the best means of accomplishing this end. We do not approve of government bounties at all; they are expensive, inefficient and subject to abuse. It seems useless to hope for paid professional Crow shooters in the present mental and financial condition of the country. In the meanwhile it does not seem very dangerous that ammunition companies should interest local shooting clubs who have the most at stake, to undertake the work at their own expense. That the companies sell ammunition and the shooters make a game of it is not a valid excuse against it when the country in general profits by it and no better solution is at hand.—P. A. T.

WHALE BARNACLES.—It is a familiar matter to one who explores the seashore to find plant or animal attached to plant or animal in the most bewildering fashion, particularly in the case of the plants and the more sluggish animals. Usually, however, the vertebrates are free from incommensurable overgrowths by other forms. The hump-back whales are an exception, and not infrequently they are found conspicuously dotted with the large whale barnacles. This occurs on both our Atlantic and our Pacific coasts. On the latter the ordinary whale barnacles are frequently accompanied by a stalked kind of soft consistency. These two, *Coronula diadema* and *Conchoderma auritum*, have been known for centuries, and were included by Linnaeus in his *System of Nature*. Nevertheless, descriptions, even of the external parts, of these forms have been but incomplete. I. E. Cornwall has recently (*Proc. Calif. Acad. Sc.*, Vol. XIII, No. 26, November, 1924) given many new details accompanied by figures and photographs. The specimens were supplied him by Captain J. E. Gilmore, of Cachelot, B.C.—A. G. H.



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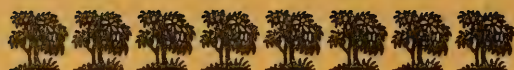
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OTTAWA, ONTARIO, APRIL, 1925

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NOTES ON THE LIFE ALONG THE YUKON-ALASKA BOUNDARY.

By M. Y. WILLIAMS.



THE SURVEY of the Yukon-Alaska boundary has passed into history as an international achievement, accompanied by much adventurous exploration. The official reports have long since been published, and among them are to be found reports on the geology, zoology and botany of the region traversed.

It so happened, however, that the writer was assistant, in 1911, to Dr. D. D. Cairnes, of the Geological Survey of Canada, and voluntarily did zoological work in addition to his other duties. A list of birds and animals observed by him, after being checked by the identification of specimens collected, was published by Dr. Cairnes¹, but no fuller statement has appeared regarding the life of that interesting and rather inaccessible region.

No equipment of any kind was available for zoological work and the only guns in the party were rifles. In spite of the limitations experienced a number of new occurrences were recorded for the district, the most notable being that of Swainson's Hawk.

It is the intention of this paper to give such information on the fauna of the region as is contained in the writer's private note book. Identifications have been made conservatively and after comparison with the lists of Bishop and Macoun. Except where specimens were taken and examined, however, subspecific determination is based on geographical probability.

The region principally under discussion is included by Osgood² in his Hudsonian-Yukon faunal district, which "includes all of the Yukon region from Fort Selkirk to the limit of trees".

In general this region lies within the northern portion of Yukon plateau, and is characterized by mature topography—groups of rounded mountains alternating with wide, swampy river and stream valleys. The drainage is to the west and tributary to the Yukon River. The maximum elevation near the 141st meridian is 4000 feet above sea-level, the minimum being 800 feet at Rampart House. The larger river valleys have an elevation at the boundary varying between 1200

and 1500 feet, the average mountain peaks rising to 2500 feet. The timber line is approximately at 2300 feet, but there is much variation, and dwarf birch and spruce straggle considerably higher than other species.

The common trees, as already described by Cairnes, are: white spruce (*Picea canadensis*), aspen poplar (*Populus tremuloides*), balsam poplar (*P. balsamifera*), northern canoe birch (*Betula resinifera*), tamarack (*Larix laricina*), five species of willow, and two of alder. Among the shrubs, the juniper (*Juniperus nana*), dwarf birch (*Betula glandulosa*) and "soapollali" (*Shepherdia canadensis*) are conspicuous. "Blueberries" and red currants are locally abundant.

The route followed by the writer was up Kandik River from Yukon River, about 90 miles to the 141st meridian, shovel-nosed canoes or poling boats being used for transportation. The 141st meridian was followed northward by pack-train to Rampart House on Porcupine River, which supplied an easy means of travel to Fort Yukon, Alaska.

The trails followed had already been used for two years by the Boundary survey parties, and the larger mammals had probably learned to shun this region to some extent. Caribou and bear were not so plentiful as reported for previous years, and no sheep were seen, although reported common formerly.

Following is a summary of the observations made, including some occurrences from the Southern Yukon region. Most of the observations were made, however, along the 141st meridian between latitude 65°50' and 67°25'.

BIRDS

1. *Gavia pacifica*. PACIFIC LOON.—One, Porcupine River, August 28th.

2. *Gavia stellata*. RED-THROATED LOON.—One, Kandik River, June 6th.

3. *Larus glaucescens glaucescens*. GLAUCOUS-WINGED GULL.—A pure white Gull was seen on Kandik River, May 29th.

4. *Larus argentatus*. HERRING GULL.—One, probably of this species, on Porcupine River, August 28th.

5. *Larus philadelphia*. BONAPARTE'S GULL.—One, probably of this species, seen 30 miles below White Horse, May 16th.

¹Geol. Surv. Canada, Summ. Rept., 1911, p. 26. Ibid-Memoir 67, p. 19.

²U.S. Department of Agriculture, Division of Biological Survey, North American Fauna. No. 19. October, 1900.

6. *Mergus americanus*. AMERICAN MERGANSER.—Several on Kandik River, June 6th and 8th.

7. *Mergus serrator*. RED-BREASTED MERGANSER.—Several on Kandik River, June 12th. This species has not been previously reported.

8. *Anas platyrhynchos*. MALLARD.—A male 30 miles below White Horse, May 16th; a nest and 7 eggs reported below Carmacks, May 20th; common on Coffee Creek, May 25th.

9. *Dafila acuta tzitzihoo*. AMERICAN PINTAIL.—A pair 60 miles below White Horse, May 19th.

10. *Marila marila*. SCAUP DUCK.—One at Carmacks, May 20th.

11. *Glaucionetta islandica*. BARROW'S GOLDEN-EYE.—A pair 30 miles below White Horse, May 16th; one at Carmacks, May 20th. This species has not been previously recorded, but has since been collected by the writer on the Fort Nelson River of the Liard system.

12. *Charitonetta albeola*. BUFFLE-HEAD.—One pair 30 miles below White Horse, May 16th. Common at Carmacks, May 20th.

13. *Histrionicus histrionicus* (subsp.?). HARLEQUIN DUCK.—One on Kandik River, June 13th. One on Orange Creek, June 20th.

14. *Branta canadensis hutchinsi*. HUTCHINS'S GOOSE.—One, Yukon Crossing, May 24th, subsp.?; five, Coffee Creek, May 25th, subsp.?; two, Kandik River, June 2nd. One of these, which was killed, measured 24 inches and had 17 tail-feathers. A male killed on Kandik River, June 7th, measured 29½ inches and had 16 tail-feathers. The head and neck are in Victoria Memorial Museum. Several on Kandik River, June 8th, subsp.?; one killed on Kandik River, June 9th, subsp.? Several with young seen on Kandik River, June 13th, subsp.?.

15. *Gallinago delicata*. WILSON'S SNIBE.—Lat. 66°41', August 14th.

16. *Tringa solitaria cinnamomea*. WESTERN SOLITARY SANDPIPER.—About 30 miles below White Horse, May 16th. One on Bern Creek, July 19th.

17. *Heteroscelus incanus*. WANDERING TATTLER.—Kandik River, June 12th.

18. *Actitis macularia*. SPOTTED SANDPIPER.—Common on Coffee Creek, May 24th. Several on Kandik River, June 7th.

19. *Canachites canadensis osgoodi*. ALASKA SPRUCE PARTRIDGE.—Seen 60 miles below White Horse, May 20th. A male taken in Lat. 66°40', August 7th. A female and three young taken August 18th.

20. *Bonasa umbellus umbelloides*. GRAY RUFFED GROUSE.—A light-colored female taken at Carcross, May 10th.

21. *Lagopus lagopus lagopus*. WILLOW PTARMIGAN.—Several taken near Rampart House.

One sent to Victoria Memorial Museum, August 26th.

22. *Lagopus rupestris rupestris*. ROCK PTARMIGAN.—Fairly common along 141st meridian between June 17th and August 4th. Three taken. Very young chicks seen June 24th. Young flying well, July 19th.

23. *Pediæcetes phasianellus phasianellus*. SHARP-TAILED GROUSE.—Seen 60 miles below White Horse, May 19th.

24. *Circus hudsonius*. MARSH HAWK.—One in light phase, at Yukon Crossing, May 24th.

25. *Accipiter velox*. SHARP-SHINNED HAWK.—Two at Kandik River, June 1st.

26. *Buteo swainsoni*. SWAINSON'S HAWK.—This was the commonest Hawk in the country and was observed from 60 miles below White Horse on May 18th to the Porcupine River, August 28th. Birds in dark plumage were common. One female in black plumage shot by Dr. Cairnes in lat. 66°40', August 14th, and sent to Victoria Memorial Museum.

27. *Aquila chrysaëtos* (?). GOLDEN EAGLE.—Probably this species seen about 60 miles south of Porcupine River, August 20th. Not previously reported.

28. *Falco peregrinus anatum*. DUCK HAWK.—Kandik River, June 11th. Porcupine River, August 28th.

29. *Falco columbarius* (subsp.?). PIGEON HAWK.—Lat. 66°40', identification doubtful. Seen at Rampart House, August 27th.

30. *Pandion haliaëtus carolinensis*. OSPREY.—Bird and nest in top of live spruce, 35 feet from ground, Kandik River, June 8th. Pair and nest, Kandik River, June 11th.

31. *Surnia ulula caparoch*. AMERICAN HAWK OWL.—Dead one seen 30 miles below White Horse, May 16th. Four seen, one taken, lat. 66°40', August 7th.

32. *Ceryle alcyon alcyon*. BELTED KINGFISHER.—One, 60 miles below White Horse, May 19th. One, Kandik River, May 29th. One, Kandik River, June 7th. One, lat. 66°40', August 14th.

33. *Dryobates villosus* (subsp.?). HAIRY WOODPECKER.—Probably this species seen 60 miles below White Horse, May 20th.

34. *Picoides americanus fasciatus*. ALASKA THREE-TOED WOODPECKER.—Three-toed Woodpeckers with white on back were seen 30 miles below White Horse on May 16th and at Carmacks, May 20th.

35. *Colaptes cafer collaris*. RED-SHAFTED FLICKER.—Seen 60 miles below White Horse, May 18th, and at Carmacks, May 20th.

36. *Sayornis sayus*. SAY'S PHOEBE.—Several seen about 10 miles north of Black River, August 3rd and 7th.

37. *Otocoris alpestris arctica*. PALLID HORNED LARK.—Horned Larks were seen near Orange Creek, June 23rd.

38. *Perisoreus canadensis canadensis*. CANADA JAY.—Sparingly distributed. Dark young seen on the flats of the Black River, July 6th and 24th. Two specimens taken.

39. *Corvus corax principalis*. NORTHERN RAVEN.—Orange Branch, Black River, June 19th. Porcupine River, August 28th.

40. *Euphagus carolinus*. RUSTY BLACKBIRD.—Carcross, May 10th.

41. *Pinicola enucleator* prob. *alascensis*. PINE GROSBEAK.—Male in mountains near Bern Creek, July 1. A pair seen on July 8th.

42. *Loxia leucoptera*. WHITE-WINGED CROSS-BILL.—Bern Creek, July 19th.

43. *Leucosticte tephrocotis littoralis*. HEPBURN'S ROSY FINCH.—A bird probably of this species seen at about 3500 feet elevation near Bern Creek, July 17th.

44. *Acanthus linaria* (?). REDPOLL.—No white on rump; red of throat and forehead bright. Near Orange Creek, June 24th.

45. *Zonotrichia leucophrys gambeli*. GAMBEL'S SPARROW.—Seen 30 miles below White Horse, May 14th, and at Yukon Crossing, May 24th.

46. *Spizella monticola ochracea*. WESTERN TREE SPARROW.—Yukon Crossing, May 24th.

47. *Passerella iliaca* (subsp.?). FOX SPARROW.—One in song on Kandik River, June 11th.

48. *Petrochelidon lunifrons lunifrons*. CLIFF SWALLOW.—At Ramparts of Porcupine River, August 28th.

49. *Tachycineta thalassina lepida*. NORTHERN VIOLET-GREEN SWALLOW.—Several 50 miles below White Horse, May 17th. Common at Carmacks, May 20th.

50. *Riparia riparia*. BANK SWALLOW.—Probably some of the holes in the banks of the branches of the Black River were made by this species.

51. *Dendroica aestiva rubiginosa*. ALASKA YELLOW WARBLER.—Yukon Crossing, May 24th.

52. *Dendroica coronata hooveri*. HOOVER WARBLER.—Birds probably of this species on Orange Creek, June 22-23rd.

53. *Penthestes hudsonicus* (subsp.?). HUDSONIAN CHICKADEE.—Dark birds, probably of this species, were seen near Bern Creek on July 7th, and 10 miles north of the Black River on August 4th.

54. *Regulus calendula calendula*. RUBY-CROWNED KINGLET.—Near Bern Creek, July 8th.

55. *Myadestes townsendi*. TOWNSEND'S SOLITAIRE.—One taken near Bern Creek, July 17th.

56. *Hylocichla* (sp.). THRUSH.—Common songster on burnt ridges during June and early

July. Seen up to 3400 feet elevation and as far north as Bern Creek. One immature specimen taken. Probably more than one species present.

57. *Planesticus migratorius migratorius*. ROBIN.—Comparatively scarce. Seen principally on mountain tops up to 2500 feet. Young half-grown, but flying, seen near Orange Creek, June 24th, and young seen flying, July 1st.

58. *Ixoreus naevius* (subsp.?). VARIED THRUSH.—The monotonous whistle of this bird sounded all night along Kandik River during late May and early June. Seen in interior to Bern Creek. Two taken, July 1 and July 15.

MAMMALS

1. *Rangifer* (sp.?) prob. *arcticus*. CARIBOU.—Many antlers on ridges, especially north of Black River. Three fat bulls seen about 60 miles south of Porcupine River. One taken by writer August 20th measured as follows: Length, 6 ft. 5 in.; height at shoulder, 4 ft. 3 in.; between widest points of antlers, 3 ft. 5 in.; from tip of brow line to top of back tine, 3 ft. 5 in.; left antler, 26 points; right antler, 14 points. Trapper reported caribou very plentiful along Black River in winter.

2. *Alces gigas*. ALASKA MOOSE.—Generally scattered through country. Five taken for food. A large bull shot near Bern Creek, July 19, had a 60-inch spread of antlers, which were still in the velvet.

3. *Ovis dalli*. DALL MOUNTAIN SHEEP.—These were reported as common during previous years, and some signs were seen on the mountains. Three young ones were seen by the packers and one was taken.

4. *Sciurus hudsonicus*. HUDSON BAY RED SQUIRREL.—One seen 60 miles below White Horse, May 20th.

5. *Citellus* (sp.). GOPHER OR GROUND SQUIRREL.—Common at Carmacks, May 20, also in mountains south of Black River in July.³

6. *Castor canadensis*. AMERICAN BEAVER.—Beaver cuttings common along Kandik River.

7. *Microtus xanthognathus*. CHESTNUT-CHEEKED VOLE.—One found dead near Bern Creek, July 2nd.

8. *Erethizon epixanthum*. YELLOW-HAIRED PORCUPINE.—One in valley of Black River, July 27th.

9. *Lepus americanus dalli*. DALL VARYING HARE.—Probably this sub-species common along Stewart River below White Horse at least as far as Carmacks in May. One in lat. 66°40', August 9th.⁴

³The former are probably *Citellus plesius*, but the specimens which I have examined from the northern part of the boundary region are undoubtedly *Citellus parryi*.—R. M. A.

⁴The latter is more probably *Lepus americanus macfarlandi*.—R. M. A.

10. *Vulpes fulva*. CROSS FOX.—One seen on Porcupine River below Ramparts, August 29th.

11. *Ursus americanus*. BLACK BEAR.—Several along Yukon below Dawson, May 28th. One on Black River, July 22nd.

12. *Ursus* (sp.?). GRIZZLY BEAR.—Two seen north of Black River by Dr. Cairnes, July 27th and August 2nd.

13. *Martes americana actiosa*. ALASKA MARTEN.—Trapper on Black River stated that the marten was his main catch of fur.

AMPHIBIA

Rana (sp.). FROG.—Heard at Carcross, May

10th. One reported as having been seen here May 15th. Heard lower down Yukon River and on Kandik River.

REPTILES

GARTER SNAKE.—One 18 inches long reported by D. H. Nellis, 43 miles south of Dawson.

FISH

Thymallus signifer. GRAYLING.—Common in all mountain streams. The largest taken was 14 inches long.

Catostomus (sp.?). MULLET OR SUCKERS.—Some seen on the bottom of Black River, July 16th.

A PRELIMINARY LIST OF THE BIRDS OF THE LINDSAY DISTRICT, ONTARIO

By E. W. CALVERT

(Concluded from page 51)

88. *Otocoris alpestris praticola*. PRAIRIE HORNED LARK.—Common. Rare from Christmas to late January.

89. *Cyanocitta cristata cristata*. BLUE JAY.—Common resident, local; very common, often abundant in migrations.

90. *Perisoreus canadensis canadensis*. CANADA JAY.—Frequent during November, 1904; last seen March, 1905.

91. *Corvus brachyrhynchos brachyrhynchos*. CROW.—Abundant summer resident, scarce in winter.

92. *Dolichonyx oryzivorus*. BOBOLINK.—A very common summer resident.

93. *Molothrus ater ater*. COWBIRD.—Common summer resident.

94. *Agelaius phoeniceus phoeniceus*. RED-WINGED BLACKBIRD.—Common summer resident, very common locally.

95. *Sturnella magna magna*. MEADOWLARK.—A very common summer resident.

96. *Icterus galbula*. BALTIMORE ORIOLE.—Common summer resident.

97. *Euphagus carolinus*. RUSTY BLACKBIRD.—Common spring and abundant fall migrant. One observed in Manvers Township, December 22, 1919.

98. *Quiscalus quiscula æneus*. BRONZED GRACKLE.—Common summer resident, abundant migrant.

99. *Hesperiphona vespertina vespertina*. EVENING GROSBEAK.—A female observed May 11, 1914. Several seen during the winter of 1919-20.

100. *Pinicola enucleator leucura*. PINE GROSBEL.—Irregular winter visitor, sometimes common.

101. *Carpodacus purpureus purpureus*. PURPLE FINCH.—Tolerably common summer resident;

common migrant; often a common winter resident.

102. *Loxia curvirostra minor* (Red) CROSSBILL.—A very irregular winter visitor.

103. *Loxia leucoptera*. WHITE-WINGED CROSSBILL.—More numerous than the last, to judge from records. Observed in winters of 1906-07, 1914-15 and 1919-20.

104. *Acanthis linaria linaria*. REDPOLL.—Winter resident, often common.

105. *Astragalinus tristis tristis*. GOLDFINCH.—Common summer resident, usually scarce in winter.

106. *Spinus pinus*. PINE SISKIN.—Winter visitor, often common.

107. *Passer domesticus*. HOUSE SPARROW.—Abundant resident.

108. *Plectrophenax nivalis nivalis*. SNOW BUNTING.—A common winter visitor.

109. *Poæetes gramineus gramineus*. VESPER SPARROW.—Abundant summer resident.

110. *Passerculus sandwichensis savanna*. SAVANNAH SPARROW.—A very common summer resident.

111. *Zonotrichia leucophrys leucophrys*. WHITE-CROWNED SPARROW.—Frequent migrant, sometimes common.

112. *Zonotrichia albicollis*. WHITE-THROATED SPARROW.—Common summer resident locally, abundant migrant.

113. *Spizella monticola monticola*. TREE SPARROW.—Common migrant, often abundant locally; sometimes common in winter.

114. *Spizella passerina passerina*. CHIPPING SPARROW.—Common summer resident; very common locally, in Lindsay and elsewhere.

115. *Junco hyemalis hyemalis*. SLATE-COLORED JUNCO.—Scarce summer resident locally; abundant migrant; a not common winter resident.

116. *Melospiza melodia melodia*. SONG SPARROW.—Abundant summer resident; very scarce winter resident; some young hatched by May 25.

117. *Melospiza georgiana*. SWAMP SPARROW.—Common summer resident; abundant locally.

118. *Passerella iliaca iliaca*. FOX SPARROW.—A tolerably common fall and scarce spring migrant.

119. *Pipilo erythrophthalmus erythrophthalmus*. TOWHEE.—Frequent migrant; a not common summer resident.

120. *Hedymeles ludovicianus*. ROSE-BREADED GROSBEAK.—A tolerably common summer resident; common in Cartwright.

121. *Passerina cyanea*. INDIGO BUNTING.—Frequent summer resident, common locally.

122. *Piranga erythromelas*. SCARLET TANAGER.—Frequent summer resident.

123. *Progne subis subis*. PURPLE MARTIN.—Frequent summer resident in Lindsay and in several towns and villages; common in Port Perry.

124. *Petrochelidon lunifrons lunifrons*. CLIFF SWALLOW.—Frequent summer resident very locally; common twenty-five or more years ago (in nineties).

125. *Hirundo erythrogastra*. BARN SWALLOW.—A very common summer resident.

126. *Iridoprocne bicolor*. TREE SWALLOW.—Summer resident; very common southward from Lindsay; apparently scarce about Sturgeon Lake.

127. *Riparia riparia*. BANK SWALLOW.—Frequent summer resident in Ops and Emily; common about Sturgeon and Scugog Lakes.

128. *Stelgidopteryx serripennis*. ROUGH-WINGED SWALLOW.—Scarce near Port Perry; observed only in spring.

129. *Bombycilla cedrorum*. CEDAR WAXWING.—Common summer resident.

130. *Lanius borealis*. NORTHERN SHRIKE.—A not common winter resident.

131. *Lanius ludovicianus migrans*. MIGRANT SHRIKE.—Scarce since 1919; a common summer resident about 1903.

132. *Vireosylva olivacea*. RED-EYED VIREO.—A very common summer resident; abundant locally.

133. *Vireosylva gilva gilva*. WARBLING VIREO.—A tolerably common summer resident locally; common in Lindsay.

134. *Lanivireo flavifrons*. YELLOW-THROATED VIREO.—Tolerably common migrant; formerly recorded throughout the summer.

135. *Lanivireo solitarius solitarius*. BLUE-HEADED VIREO.—A tolerably common migrant. One recorded October 12, 1919.

136. *Mniotilta varia*. BLACK AND WHITE WARBLER.—Common summer resident; abundant migrant.

137. *Vermivora ruficapilla ruficapilla*. NASHVILLE WARBLER.—Frequent summer resident locally; very common migrant.

138. *Vermivora peregrina*. TENNESSEE WARBLER.—A tolerably common migrant.

139. *Compothlypis americana pusilla*. NORTHERN PARULA WARBLER.—Tolerably common migrant; sometimes common. A summer resident near Balsam Lake (Rosedale).

140. *Dendroica tigrina*. CAPE MAY WARBLER.—Recorded at Pleasant Point in August, 1914 (Dale). Tolerably common at Port Perry in the spring of 1924.

141. *Dendroica aestiva aestiva*. YELLOW WARBLER.—Common summer resident.

142. *Dendroica caerulescens caerulescens*. BLACK-THROATED BLUE WARBLER.—Very scarce summer resident; common migrant.

143. *Dendroica coronata coronata*. MYRTLE WARBLER.—Scarce summer resident from Lindsay south; rather common about Sturgeon Lake; abundant migrant.

144. *Dendroica magnolia*. MAGNOLIA WARBLER.—Frequent summer resident, common locally; very common, sometimes abundant migrant.

145. *Dendroica pensylvanica*. CHESTNUT-SIDED WARBLER.—Frequent summer resident; common locally and in migrations.

146. *Dendroica castanea*. BAY-BREADED WARBLER.—Usually a common fall migrant; occasionally abundant in spring; irregular.

147. *Dendroica striata*. BLACK-POLL WARBLER.—Usually a tolerably common migrant.

148. *Dendroica fusca*. BLACKBURNIAN WARBLER.—Scarce summer resident; very common migrant, sometimes abundant.

149. *Dendroica virens*. BLACK-THROATED GREEN WARBLER.—Common summer resident locally; abundant migrant.

150. *Dendroica vigorsii*. PINE WARBLER.—Scarce summer resident locally.

151. *Dendroica palmarum* (subsp.). PALM WARBLER.—Frequent migrant.

152. *Seiurus aurocapillus*. OVEN-BIRD.—Common summer resident.

153. *Seiurus noveboracensis* (subsp.). WATER-THRUSH.—Common summer resident, abundant locally.

154. *Oporornis philadelphia*. MOURNING WARBLER.—Frequent summer resident.

155. *Geothlypis trichas trichas*. MARYLAND YELLOW-THROAT.—A very common summer resident.

156. *Wilsonia pusilla pusilla*. WILSON'S WARBLER.—One observed August 19, 1914, at Pleasant Point (Dale); one seen in spring near Reaboro by the writer; tolerably common in the spring of 1924 near Port Perry.

157. *Wilsonia canadensis*. CANADA WARBLER.—A rather common summer resident.

158. *Setophaga ruticilla*. REDSTART.—A common summer resident; very common locally and in migrations.

159. *Anthus rubescens*. PIPIT.—A common fall and rather scarce spring migrant.

160. *Dumetella carolinensis*. CATBIRD.—Common summer resident, abundant in Cartwright.

161. *Toxostoma rufum*. BROWN THRASHER.—A not common summer resident, tolerably common at Port Perry.

162. *Troglodytes aëdon aëdon*. HOUSE WREN.—Common summer resident, most common in Sturgeon Point and in Lindsay.

163. *Nannus hiemalis hiemalis*. WINTER WREN.—Scarce summer resident, rather common locally; common migrant.

164. *Cistothorus stellaris*. SHORT-BILLED MARSH WREN.—Tolerably common as a summer resident near Port Perry in 1924.

165. *Telmatodytes palustris palustris*. LONG-BILLED MARSH WREN.—Very common summer resident in marshes from Sturgeon Lake south.

166. *Certhia familiaris americana*. BROWN CREEPER.—Resident; common in migrations; a not common summer and winter resident.

167. *Sitta carolinensis carolinensis*. WHITE-BREASTED NUTHATCH.—Common resident.

168. *Sitta canadensis*. RED-BREASTED NUTHATCH.—Scarce summer resident, local; irregular resident in winter.

169. *Penthestes atricapillus atricapillus*. CHICKADEE.—Common resident, abundant at certain times.

170. *Regulus satrapa satrapa*. GOLDEN-CROWNED KINGLET.—Very common, sometimes abundant in migrations; sometimes a winter resident.

171. *Regulus calendula calendula*. RUBY-CROWNED KINGLET.—Common migrant, sometimes very common.

172. *Hylocichla mustelina*. WOOD THRUSH.—Scarce summer resident.

173. *Hylocichla fuscescens fuscescens*. VEERY.—Common summer resident, abundant locally.

174. *Hylocichla ustulata swainsoni*. OLIVE-BACKED THRUSH.—A tolerably common migrant, sometimes common.

175. *Hylocichla guttata pallasii*. HERMIT THRUSH.—Common migrant, possibly a summer resident.

176. *Planesticus migratorius migratorius*. ROBIN.—Very common summer resident, some young hatched by May 20.

177. *Sialia sialis sialis*. BLUEBIRD.—Common summer resident.

The following species are HYPOTHETICAL:

Mareca americana. BALDPATE.—Scarce migrant at Port Perry.

Marila valisineria. CANVAS-BACK.—Scarce fall migrant at Port Perry; also a migrant at Valentia.

Glaucionetta islandica. BARROW'S GOLDEN-EYE.—Early spring migrant at Valentia.

Somateria spectabilis. KING EIDER.—A drake and two ducks taken in the fall of 1909 near Valentia by Charles Parkin.

Oidemia perspicillata. SURF SCOTER.—Scarce migrant near Valentia.

Erismatura jamaicensis. RUDDY DUCK.—A not common migrant near Valentia.

Pisobia maculata. PECTORAL SANDPIPER.—Rare (?) migrant.

Pisobia minutilla. LEAST SANDPIPER.—A probable migrant.

Colinus virginianus virginianus. BOB-WHITE.—Reported from near Valentia by Charles Parkin many years ago.

Canachites canadensis canace. CANADA SPRUCE PARTRIDGE.—Found west of Lindsay about 1885.

Ectopistes migratorius. PASSENGER PIGEON.—Reported by several old residents.

Falco peregrinus anatum. DUCK HAWK.—Rare migrant at Scugog Lake.

Surnia ulula caparoch. HAWK OWL.—One taken near Irondale in the fall of 1919 and mounted by Mr. W. G. Brooks.

Phlæotomus pileatus abieticola. NORTHERN PILEATED WOODPECKER.—Reported in winter from Manvers Township near Janetville.

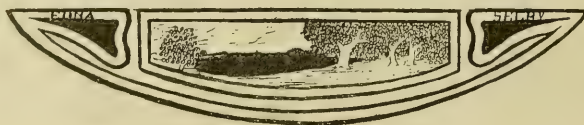
Empidonax flaviventris. YELLOW-BELLIED FLY-CATCHER.—Doubtfully recorded from Port Perry in spring of 1924.

Corvus corax principalis. NORTHERN RAVEN.—Found in the northern part of Victoria County.

Bombycilla garrula. BOHEMIAN WAXWING.—Reported near Reaboro in the winter of 1917.

Vireosylva philadelphia. PHILADELPHIA VIREO.—Doubtfully recorded at Reaboro.

Hylocichla alicia alicia. GRAY-CHEEKED THRUSH.—Almost certainly found in migrations.



NOTES ON SOME SUMMER BIRDS OF THE MAGDALEN ISLANDS

By P. B. PHILIPP



IT HAS BEEN the good fortune of the writer to make four trips to the Magdalen Islands, at widely separated times.

This has been of particular advantage in giving an opportunity to make comparisons as to the numerical abundance of certain species as affected by seasonal conditions, protective acts, and the changed attitude of the natives toward the bird life of the Islands.

The small group of islands making up the Magdalens has always been and still is of great interest to the ornithologist, and, in spite of their nearness to civilization and comparative ease of access, there is much room for observation and study. June weather in the Islands is always cold, frequently stormy, and gives a fair imitation of the sub-boreal conditions found considerably farther north. The bird life is likewise what would be looked for in a more northern zone. For instance, the Least Sandpiper and the Fox Sparrow are abundant breeders, as is also a Horned Lark, some specimens of which come pretty close in color and measurement to the true Horned Lark.

A most convenient and attractive feature of the bird life is the close grouping during the nesting season of widely different species. For example, in a small marshy tract of one hundred acres I have found breeding Black Duck, Red-breasted Merganser, Green-winged Teal, Least Sandpiper, Wilson's Snipe, American Bittern, Rusty Blackbird, Bronzed Grackle, Fox Sparrow, Savanna Sparrow, Song Sparrow, Swamp Sparrow, Blackpoll Warbler, Yellow Warbler and Robin. On high ground within a half-mile radius were Black Guillemot, Raven, Bank Swallow, Ruby-crowned Kinglet, Golden-crowned Kinglet, Junco, White-throated Sparrow and Yellow-bellied Flycatcher.

With the idea that an account of the breeding habits of some of the most interesting and unusual birds will be more desirable than a formal list, this paper will be devoted to such notes and observations as I have made on the birds that are typical of the Islands.

THE LEAST SANDPIPER (*Pisobia minutilla*).

The protection afforded by the Canadian Migratory Birds Convention Act and similar acts in the States certainly appears to have effected a large increase in the numbers of this dainty shore bird. In 1907 an exhaustive search for breeding birds resulted in finding eleven pairs. In 1923 in the same territory over fifty pairs were located with eggs or young.

The nesting of any of the Limicolae is interesting, and not a great many data concerning this most important period of the bird's life have found their way into the books. It is very fortunate, therefore, that such a good opportunity is offered for close study of one of the more northern breeding species.

The Least Sandpiper has two entirely dissimilar ways of nesting, which may be termed wet and dry, and appears to use either indiscriminately. The wet nesting sites are the grassy moss bogs, usually close to tide water, and the dry nesting is on the high dry ridges where grow stunted spruce and bay-berry bushes. In either case the nest is simple. The bird picks out a spot in the wet moss of a bog or in the dry leaves of a ridge, and scratches a shallow hollow in which it sits, and, by rapidly turning, molds a depression of the required depth. Which of the pair does this I have never determined, but the other bird is usually present, standing close to the nest-builder and offering encouragement with a low, rapid twittering.

After the hollow has been fashioned to the bird's satisfaction, a meager lining of bits of dead grass, or dead labrador tea or bayberry leaves is added, and the nest is ready for the eggs. These are usually deposited daily, most frequently early in the morning. The usual set is four, though some complements are filled at three. Like those of most of the family, the eggs are very large for the size of the bird, are extremely pyriform, and arranged with their points together and well down in the nest, so that the large ends lie closely adjacent. This grouping permits the tiny body of the bird to cover them in incubating. A series of twenty-five eggs shows: Largest 1.25 x .85; smallest 1.09 x .85; average 1.16 x .86.

In spite of the large egg and small bird body, the laying of an egg is a fairly expeditious occurrence. I passed a new nest early one morning. Both birds were at the empty hollow, and one was arranging the dead leaves of the lining. I repassed the spot certainly not more than five minutes after, and one egg was in the cavity.

The duties of incubation would seem to be largely performed by the male. I have collected four birds from the nests and all proved to be males on dissection. Also a bird which was accidentally stepped on while it was shielding four young or "downies" was a male. In fact after the eggs are laid both birds are seldom seen around the nest. The incubating bird is most solicitous about its

nest. It sits very closely and, when flushed, half runs, half flutters for a few feet, as if trying to lead the intruder away. If you are not deceived by these actions but remain quiet, the bird soon returns and walks daintily about, uttering a quickly repeated *peep, peep, peep*, often with such vehemence that the saliva fairly runs from its bill.

The birds arrive in the Islands about May 20th, but housekeeping does not begin at once. Although I have been there in the last of May, the first egg I have ever found was found on the second of June. The incubation period is about fifteen or sixteen days, two nests watched hatching in these periods taken from the laying of the fourth egg. The young are beautiful little creatures, covered with brown down flecked with whitish spots, and they can run almost as soon as hatched, and are very difficult to find once they have lost themselves in the grass or in the moss.

Altogether the Least Sandpiper is one of the most interesting of the Island birds, and one the student never tires of watching.

WILSON'S SNIPE (*Gallinago delicata*).

This large, strong wader is one of the commonest birds of the Islands. Probably in no place of equal area is the species more abundant. Nowhere, day or night, in localities in any way suitable, can you fail to hear their raucous *scaip, scaip* or the whistling peculiar to them which they make in flight. The Snipe is one of the earliest arrivals in the Islands, coming the last of April, and the Islanders say that when a Snipe is heard winter is gone and spring has come.

The nesting begins in the last ten days of May, and is a simple affair. Usually wet marshy ground is selected, preferably with low brush and grass, with lumps or tussocks rising above the bog water. The nest is a shallow hollow made in the grass or moss of one of these lumps, lined with broken bits of dead grass and sometimes with dead leaves. The usual set is four, and, as with others of the family, large for the bird. Placed with their points together and extending downward into the nest, the eggs take up very little room for their size and are easily covered. A series of twenty-four eggs measures: Largest 1.66 x 1.08; smallest, 1.37 x 1.08; average 1.49 x 1.06.

The bird is a very close sitter and flutters off almost under one's feet, and it is no trick to catch one in the hand. Which bird does the incubating I do not know. Of one accidentally stepped on, and two collected from the nest, all were males, so that the male does at least some of the incubating.

The period of incubation is about eighteen days, and the young can run about almost as soon as

they are hatched. The "downies" are very beautiful little creatures, a sort of peculiar mahogany brown, almost claret color, flecked with light spots, and their legs are strong and sturdy. They mature very fast, and the end of June finds some fairly proficient on the wing. When disturbed, especially when there are young about in the grass, the parent birds have a habit of alighting on a low spruce or tamarack and giving vent to a most ludicrous series of yelps, and a Snipe marsh at the end of June is no place for any one with delicate ears.

This wader has increased in numbers since 1907, and in 1923, the year of my last visit, was really abundant.

RUSTY BLACKBIRD (*Euphagus carolinus*).

This fine member of the family is another early arrival, reaching the Islands, according to the fishermen, early in May, and is another typical bird of the region, being found almost anywhere, in various situations. Most commonly they breed in or about the edges of the boggy marshy ponds and swamps, building low in the spruce and tamarack (juniper).

They are early nesters, as I have found well grown young in the second week in June. The nests are large and bulky, but, in spite of their size, so closely match the surroundings that they easily pass unnoticed. Built low in a mossy tree or bush, they have an outer structure of dead tamarack twigs to which cling strands of moss, and a little mud, well cupped, with a lining of green grass. This latter is quite characteristic, and distinguishes this nest from that of the Bronzed Grackle, which breeds sparingly. The birds sit close and the female does most, if not all, of the incubating. I have never found the male on the eggs.

The usual complement of eggs is four or five and they vary much in color. The general type is quite characteristic, however, and the egg can be easily distinguished from those of the other Blackbirds. A series of twenty-five eggs measure: Largest 1.03 x .71; smallest .88 x .73; average, .97 x .74.

After the young come out both birds are most solicitous, and by catching a nestling and tethering it in a suitable bush, very good pictures can be obtained. The one illustrated was thus taken, the old bird being quite fearless.

They may well be called the policemen of the bogs. Nothing stirs without two or three of the birds starting an investigation. If anything really serious develops, such as the appearance of a Hawk or an Owl, every Rusty in the neighborhood comes on the scene, and there is a fine hue

and cry. In one swamp a pair of Short-eared Owls had taken up their residence and it was easy enough to locate the Owl by his retinue of Rustys. A fine bird; a valiant defender of his family, apparently doing no damage to other birds, or to the slender crops of the fishermen. Long may his "Red-wing" note be heard over the bogs and the spruce tops of his summer home.

SEMPALMATED PLOVER (*Charadrius semipalmatus*).

The "Redleg" is to me one of the most interesting birds with which I have ever come into intimate contact. For pure craft and dissimulation this dainty Plover well upholds the characteristics of the family, of which it and its near congener, the Piping Plover, are the breeding representatives in the Magdalens.

It is exceedingly abundant in suitable localities, frequenting the low inside beaches and flats, especially where masses of dried eel-grass and other dead seaweed have been left by the spring tides. Its habitat thus gives it the long range of vision which it seems to require, and it is seldom caught napping.

The first seen of the bird is usually on the edge of the water, where it has run unobserved from its nest, and it starts so quickly and runs so fast it is next to impossible to catch it near home. A good way to hunt is to go slowly along the edge of the sand-dunes and keep looking a hundred yards or so ahead, watching for the least movement where the grass meets the flat beach. If one is lucky, he will be rewarded by seeing one of these little fellows running out onto the open beach. Then a line is taken straight back into the beach grass and dead seaweed, and, if a sharp enough look is kept, the nest will be found.

A nest as such is not constructed. A shallow hollow is scratched in the sand and this is lined with bits of dead eel-grass, or a hollow is scratched in a bunch of dead seaweed. In this are laid the four eggs with their points together. The eggs vary greatly in color, from a drab ground to a greenish, well covered with spots and blotches of brownish purple and almost black. Whatever the variation, however, they match their surroundings perfectly and are very difficult to see. From what little experience I have had with the bird I judge that the female (as in the case of the Piping Plover) does most of the incubating, three birds shot off the nest being of this sex. A series of 12 eggs measure: Largest 1.40 x .97; smallest 1.23 x .97; average 1.32 x .97, the eggs being large for the bird. The eggs are laid for the most part in the first week in June, and the young appear in the last week. They are very sturdy, can run almost as soon as they are hatched, and can hide

almost as well as they can run. After the young are out both parents appear to go about with them, and families can be seen about the flats and the edges of shallow ponds left by the tide.

They are much persecuted by the French fishermen, who hunt their eggs for food, but in spite of this seem to be more numerous than they were in 1907, due, I believe, largely to their having been taken off the game list both in Canada and in the United States. They seem in no danger of extermination.

FOX SPARROW (*Passerella iliaca iliaca*).

If any one should ask what is the most pleasing bird of the Islands, to both eye and ear, I should unhesitatingly answer, the Fox Sparrow.

The Fox Sparrow, or Foxy Sparrow, as the bird might well be called, is common everywhere. In the bogs, in the stunted spruces along the beaches and in the wooded hills his delicious melody can be heard from all sides. A strong, sturdy Sparrow, it arrives in the Islands early in May before the snow has gone, and nests early.

The nests are large and bulky, though exceptionally well built, and in spite of their size are very difficult to find, so carefully are they concealed. There are two distinct nesting situations. One, and that most commonly adopted, is on the ground, either in a wet bog or on a dry hillside, under a thick mossy spruce root or a brush pile, and usually in a very thick place. The other situation is in a spruce bush, usually at a low elevation, though I have seen nests fifteen feet from the ground. This latter type is, of course, the easiest to find. The year 1923 was particularly favorable for tracking down nesting pairs. It was a late, cold Spring and even in the first week in June the snow lay deep in the bogs and woods, and this drove the birds off the ground and into the spruces, so that there was a chance of finding the nests. Later in the month, however, there were several nests found on the ground, after the snow had gone.

These Sparrow nests are made of a varied collection of materials. One before me that is typical has an outer wall of spruce twigs and Sphagnum moss, with a considerable amount of dead wood chips and coarse grass. The inner lining is of fine dried grass, and the cavity is well cupped and plentifully lined with cow hair. The eggs are large and well marked, and the complement is usually three or four. A series of fifteen eggs shows: Largest .98 x .70; smallest, .90 x .68; average .95 x .69.

The young are pretty little fellows, and by the time they leave the nest are well feathered with the family russet brown. The female does most

of the incubating and the male sings to her almost constantly. Perched on the top of a neighboring spruce, he fairly bubbles melody, and he keeps it up till late in the twilight. After the young are hatched both parents feed them, and the nest is kept scrupulously clean; and on leaving the nest they stay around in a family party till they are quite well grown.

I think that many of these Sparrows raise two broods, as I have found nearly fresh eggs late in June, in situations where I am certain the first nesting was undisturbed.

BLACK-POLL WARBLER (*Dendroica striata*).

No account of the birds of the Islands would be complete without some account of this Warbler. Nowhere in the same territorial area, with the possible exception of Seal Island, Nova Scotia, have I found the bird as abundant as it is in the Magdalen Islands. You are never out of the sound of the singing males. Even the two-foot-high stunted spruces of the sand-dunes have their quota, and they are in bog, and on hillside; everywhere, in fact, where there is any spruce.

They arrive about the first of June, but are late nesters. The first egg I ever saw there was on June 22, and they are not in full swing until the last of the month.

Like most of the spruce-nesting Warblers they have a nest which is a very beautiful structure and is large and compactly built. The female

does the building and she is a lazy carpenter, taking her time, and selecting her materials with great care. The nest is usually low, two or three feet from the ground, built in against the trunk of a spruce, supported on a couple of horizontal limbs or twigs, and firmly anchored in place.

A typical nest is a rather loosely made exterior of spruce twigs, and a blackish tree moss, coarse dead grass stems, and a few rootlets, with an interior wall of fine dead grass, well cupped, and plentifully lined with feathers; this latter material appears to be essential, and is in all nests I have examined.

The set is four to five eggs, usually the latter, though some complements are full at three. They are large handsome eggs, with a white ground color, boldly marked with brown and umber. A series of fifteen eggs show the following measurements (inches): Largest .74 x .56; smallest .66 x .54; average .70 x .55.

The males are persistent singers, and very active and pugnacious. Each has his own beat and zealously guards it from others of his race. They feed the females while the latter are sitting, and a good way to find a nest in a low thick place is to find a male with a bug and watch him.

Of the young I know nothing, as I have never been late enough to find a nest in which the eggs had hatched, and this is left for another trip and another year.



FIG. 1.—Least Sandpiper Standing Over Eggs.

FIG. 2.—The Rusty Blackbird Scolding.

FIG. 3.—The Semipalmated Plover Approaching Its Nest.



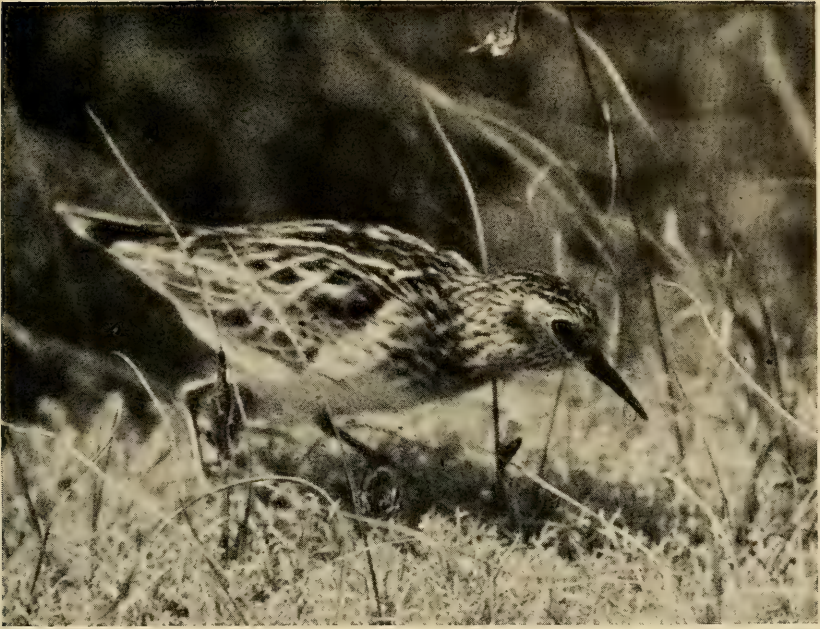


FIGURE 1—Least Sandpiper Standing Over Eggs



FIGURE 2—The Rusty Blackbird Scolding



FIGURE 3—The Semipalmated Plover Approaching Its Nest

TOP

BOTTOM



FIGURE 9—HIBERNATING SQUIRREL AND DEN (Vertical Section).

This photo shows a squirrel found November 15, 1913. He was partly awake when found, as were all discovered previous to this date. He is sitting just outside of the neck of the hibernation cell, and just above the drain, which runs down and to the left. The round circular patch of earth immediately above the squirrel is a plugged burrow filled with a lighter colored soil.

Photo from life by William T. Shaw



FIGURE 10.—THE MULCH (Vertical Section).

As a further protection from moisture, we find in the squirrel hibernation nest a thick mulch of fine dust in the bottom of the nest. It is upon this dry dust mulch that the squirrel lies during his long sleep. The photograph also shows the coarser material in the roof of the nest.

Photo by William T. Shaw



FIGURE 11.—THE CACHE (Vertical Section).

Very unexpected information has been found in connection with the matter of the food supply being stored for the winter. The nests of female and immature squirrels are almost without exception lacking in a store of food. The nests of the old males, on the other hand, very frequently, though not always, have a cache of some kind of food. Strange to say, in this stored supply they seem to prefer some wild seed or bulb to grain, and nests found in wheat fields are frequently stored with some wild seed. Furthermore, they usually use but the one kind of seed, or bulb, in a nest at a time, though several kinds of seeds and bulbs have been found in the various nests discovered. In this connection it is interesting to note that the old male squirrels appear a week to ten days before the females and immature, often when the weather is bad and food scarce, hence the need of food. It is also of interest to note that the store, which is found in the mulch or bottom of the nest, seems not to be touched during the winter, as several interesting observations tend to show, but is reserved until the time of awakening in the spring.

Photo by William T. Shaw

THE HIBERNATION OF THE COLUMBIAN GROUND SQUIRREL*

By WILLIAM T. SHAW
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State College of Washington

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(Concluded from page 61)

OPEN AND CLOSED DENS.—The hibernation dens are considered for convenience of description as open and closed. A closed den is one in which the entrance to the den has been plugged from the inside by the squirrel when going into æstivation. It is sealed from all outside intrusion and is an occupied den (Figs. 1, 9). It is, in this locality, occupied continuously for the periods of æstivation and hibernation, without being opened to the exterior. An open den is one from which the squirrel has emerged after coming from hibernation, having opened the exit shaft through to the exterior. It is frequently occupied for a few days after becoming an open den (Fig. 6).

THE DEPTH OF THE HIBERNATION CELL.—The average depth of 50 hibernation cells measured was found to be 2 feet 6 inches. The most shallow cell was 6 inches deep and the deepest 4 feet 11 inches deep (Fig. 8).

Young squirrels, or those going into æstivation for the first time, are enabled to hibernate in soil of less depth to rock than older squirrels, since they rely on the up-running shafts of old dens for drainage to their hibernation cell. One den along the rimrock was excavated and while one or two old brood-nest cavities were found, no hibernation cells were disclosed. Here the soil was not over 2 feet deep on the rock. It is supposed that sufficient depth of soil should exist below the hibernation cell to admit of a typical drain. This would hardly be the case in 2 feet of soil.

THE NUMBER OF HIBERNATING SQUIRRELS PER CELL.—The number of squirrels inhabiting the hibernation nest in the wild was invariably one. This harmonizes with the unvarying circular form of the cell. Doubtless the chief factor in controlling this would be associated with the regulation of heat, which could not be regulated so well with two squirrels occupying the same cell.

It would seem, too, that squirrels scatter at the time of going into æstivation, for they were found in separate hibernation dens as well as in separate cells. Only once, as noted previously, were two found at the same time in the same old summer den. Only one squirrel was found in a large den containing eight empty hibernation cells. It is possible that where squirrels are more abundant and conditions less disturbed, they will hibernate

closer together, e.g., in the same reconstructed summer den.

THE HIBERNATION NEST.—The hibernation nests are quite uniform. In the saucer of the cell we find a quantity of dust and finely chopped straw, making a very dry compact matting upon which the squirrel hibernates. Rising up from this, on the sides and roof, is a compact mass of coarser nest material, usually made from the grass or grain leaves growing in the immediate vicinity. A preference for the wild grasses (*Bromus*) is shown by the fact that sometimes a squirrel hibernating in the edge of grain fields will construct his hibernation nest from wild grasses growing in the nearby fence row. That this grass must be in a special condition seems to be evident from the fact that on several occasions we have found green blades mixed with dry dead grass in the nests of squirrels. One nest observed early in August seemed to be made of green grass or grain blades. Grass gathered in this condition is tougher and more pliable and holds its shape better than dead grass. Again, on March 5, while excavating a den, we found a large summer nest which was made of long dead grass blades, with now and then a living blade and a green plant leaf intermixed. The lining of the nest, however, seems to be made of finely-shredded, soft, dead grass. The outer covering is of tough, wiry, wild grass and seems to keep off the fine particles of dust which might sift down and also to prevent the moisture from the top and sides of the cell from reaching the hibernating animal. In other words, it serves as a thatch. That the nest should be affected by dirt sifting from the roof of the cell is also provided against by the fact that the hibernation cell is excavated from hard dry earth. The toilet cavities which are so conspicuously associated with the brood nest are entirely wanting here.

The hibernation nest fills the hibernation cell very completely. Consequently its size is relative to that of the cell. The material of 36 nests was noted carefully and is grouped as follows:

- 12 with wild grass;
- 12 with old decayed straw material and dirt;
- 4 were made from grain leaves;
- 2 with wild grass and rootlets;
- 2 with old dead leaves and grass roots, as pulled up by pasturing cattle;
- 1 with grain leaves and a few dry thorn leaves;
- 1 with rootlets;
- 1 with old straw and rootlets.

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As a rule, the nests of the old squirrels were made much thicker and warmer and of better material than those of the young, but in some cases, as in Fig. 2, the nest was made of old, brittle straw material. The nest of Fig. 6, on the other hand, was very warm and fresh. These are both nests of old squirrels.

THE MAT OR MULCH.—The saucer of the cell was filled with a dust mulch capable of resisting moisture (Fig. 10). It had an average depth of 3.3 inches. One mulch was 6 inches deep. It frequently was mixed with broken-down nest material, especially if the nest were an old one. In this dust mat was found the store, commonly mixed throughout with the dust, but often, in the case of wild dry seeds, packed in a neat little pile in the back part of the cell. (Fig. 11.)

The dry dust mulch serves admirably in keeping the nest proper dry, as is shown in the case of a den excavated March 1. This den was on a north slope and in wet soil. Still, the moisture had not gone through the dust mulch in the saucer. Again, on March 10, a den was opened and a very large dry nest of dead grass found. In the bottom of this a dry dust mulch, as dry as the dust in a summer road, was found. The walls of the cell were so wet, even in the bottom of the saucer, that the earth would smear when pressed.

It is probable that the mulch in the nest is not accidental and is the result, in part, of the chewing of the nest material into very fine particles. It would seem that the actual mass of dust found in the mulch would have to be scratched into the saucer as it is not connected with the bottom of the saucer, which is perfectly solid and hard and conforms to the general curvature of the cell.

THE ROOF.—In fifteen out of eighteen cases examined the nest was roofed over. The roof was usually the thinnest and lightest part of the nests. It was, on an average, 1.5 inches thick, and was made of coarse wild grass or other material capable of shedding moisture. (Fig. 10.) One roof measured was 2 inches thick. When the nest was occupied it fitted up snugly against the ceiling of the cell. This was especially noticeable in the case of a den found March 7, when the roof of the nest was of clean coarse grass. Usually a nest found broken or trampled down in the cell was one belonging to a squirrel which had been out of hibernation some days or was a nest which had been deserted entirely.

THE STORE.—It would seem from the study of these animals that they are not of the storing species. Curiously enough, the few stores found in all the investigation were found in the nests of adult males. The subject, however, is comprehensive and deserves special treatment. (Fig. 11.)

It might be of interest to know what becomes of these hibernation dens after they are no longer to be used as such.

THE FATE OF THE HIBERNATION DEN.—In most cases, shortly after the hibernation den is deserted as such, it is opened up more fully and becomes used as, or joined to, a summer den. This was the case with two hibernation exits in the observation yards. They were opened up almost at once and have been in constant use ever since as holes leading into the summer den.

In regard to field results of investigations of this condition, this much has been found. On February 19, when we were attempting to capture a squirrel in a hibernation den, we found that it had made its escape by digging through what seemed to be the shut-in plug. It was later captured in the summer den by following burrows directly connecting the two dens. On March 10, two supposed exits were found a few yards apart. On investigation the burrows leading from them were found to lead to the same hibernation nest. Evidently one of these burrows was constructed in converting this den into a summer den. So, too, on the same day a squirrel escaped from a hibernation den by gaining access to some nearby burrows of a summer den.

RECONSTRUCTION OF HIBERNATION CELL.—Observations have led to the belief that the hibernation den and frequently the hibernation cell are sometimes reconstructed from some part of a summer den, such as a burrow expansion or a summer nest. A young squirrel was found hibernating in a cell which had been made in the upper part of the exit shaft of an old hibernation den. In another case an old hole was found, tightly plugged, in the upper side of the cell and in still another instance a hole went directly through the hibernation cell but was plugged securely 13 inches beyond. This is the only normal case found where an occupied hibernation cell had two holes, however short, leading from it. Three other cases of reconstruction were found.

RECURRENT USE OF HIBERNATION CELL.—It would appear from the investigation of the reconstruction of the hibernation cell that the squirrels used the cells from year to year. This would seem evident also in those cases where old potato skins of former years were found together with fresh potatoes of the previous summer.

That they favor certain localities is shown by an observation made February 24, when examining hibernation dens. One was found placed in the side wall of an excavation that we had previously made during these investigations and had filled in again. This squirrel or another one had returned and excavated his cell in the edge of this unex-

cavated wall. The front half of the cell wall was made of both surface dirt and subsoil, as it had been filled in together, showing, in this case at least, that they return to old hibernation grounds. Three hibernation dens were found in which drains were plugged with old hard dirt of former seasons.

GOING INTO AESTIVATION.—The squirrels of a locality go into aestivation so gradually and continue so steadily that they have all disappeared before their absence is generally noticed. The young and females disappear first and the males last. From the middle of July on, until all are in, their activities are governed to a considerable degree by temperature, inasmuch as it deprives them of moisture from plant sources. On July 22 only 7 squirrels were observed on territory on which 26 were noted June 11. On August 10 it was noted that the squirrels were almost all into aestivation.

THE POSITION OF THE HIBERNATING SQUIRREL.—By this we mean the position taken in the nest while in hibernation. This is well shown in Fig. 3. The position appears most uncomfortable to us, and probably is associated with the physiological necessity of driving and keeping most of the air from the lungs at the time of going into the comatose condition. We might expect the animal to curl up comfortably as a cat or a dog does, but it does not. Instead, it lies on the flat of the sacrum and curls vertically so tightly that the nose is implanted firmly against the diaphragm. The front and hind feet of each side are brought close together and the thighs are laid out flat. Here it lies with the top of the skull parallel with the bottom of the nest. It is so snugly and tightly wrapt about by the nest that it is impossible for it to fall over.

THE PHYSIOLOGY OF HIBERNATION.—Perhaps the most striking and profound change accompanying hibernation is that associated with the great drop in body temperature. Existing with this cold, clammy state is a condition in which the respiration almost ceases, being noticeable only by a very slow peristalsis-like movement over the flank. The circulatory system is likewise reduced to its lowest state of activity. That this profound condition of coma is attained by a gradual preparation is evident by the fact that squirrels in the yards were seen to refrain from food for several days at a time, after which they would eat sparingly and again fast for a few days before finally disappearing, in order to clear the alimentary tract. It was noticed in the field as well that for some days before going into hibernation squirrels were difficult, or indeed impossible, to trap with a bait.

That they eat sparingly on again awakening has been noticed in the investigational work. In the case of the squirrel taken February 19, indications that he had resumed feeding again were found. It was noticeable in the sealed hibernation dens that no signs of their having fed were found. This was especially evident in the case of the squirrel taken March 10. This squirrel had no store, yet it appeared that he had not left his den for two days. During this time he must have been without food. Reference is also made to this in the studies of yard hibernation. The stomach of the first squirrel taken March 10 was almost empty.

INTERMITTENT AWAKENING DURING HIBERNATION.—In the yards it was found that the squirrels awake at intervals of several days, especially in the early part of their sleep. This became less frequent towards the end of their periods of torpor.

It was also noted in the wild that all of the occupied hibernation dens showed signs of activity in their burrows. They were smooth and fresh-looking and had none of the sprouting seeds and mouldy litter found throughout those of the summer dens at this season. Moreover, all of the earliest squirrels of the season, taken through November and December, were found showing signs of being active, or at least very much possessed of their senses, while those of late winter were more often found very comatose. A similar condition prevailed in the yards. (Fig. 9).

In seeking for a reason for this, a theory suggests itself in connection with the hibernation nest. In all the open summer dens examined in winter, the nests were found damp and in many cases mouldy. Not so with the hibernation nest! The difference would be this, that during these intervals of awakening from hibernation, the body temperature of the squirrels would rise rapidly from a temperature of the surroundings to a normal blood heat temperature, which would soon dry the nest sufficiently to preserve the life of the animal. It was also noticed in the yards that the squirrels, both Columbian and Townsend, repair their nests every time they awaken in the winter.

AWAKENING FROM HIBERNATION AND ITS RELATION TO SOIL TEMPERATURE.—Early in the investigation it was thought that the awakening from hibernation might be governed to some extent by soil temperature. Accordingly careful tests were taken both in the yards and in the fields. In these tests it was found that the soil temperature does not seem to assist in awakening. On February 10, the soil at 2 feet depth was 38.8 degrees F. and on March 1, at the time of the appearance of the squirrels, was 37.1 degrees F. at the same depth.

TIME OF REMAINING IN THE HIBERNATION DEN AFTER AWAKENING.—That they sometimes remain in the hibernation den for some days after coming to the surface of the ground, even in fine weather, is shown by the example of a squirrel found on February 27. This squirrel is known to have remained in its hibernation den until March 5, or a period of seven days. This was at a time when the ground was free from snow. Its nest showed signs of much use and was broken down flat.

On March 1 an exit was found that was well worn and fresh. Possibly the squirrel had been out some time, as the winter wheat about it was nibbled for a foot or two around. They probably do not leave the hibernation den soon if food is at hand. This nest was observed again on March 2, and seemed to be deserted. In such a season as that of the spring of 1917, when cold, raw, wet weather persisted for weeks, the squirrels remained in these dens longer than usual. It is possible they could not leave, not being able to stand cold, damp nests. One taken from hibernation March 10, and turned into a cold summer den in the yards was later found dead, though it seemed to have plenty of green vegetable food.

DISPERSAL AFTER HIBERNATION.—If the weather is stormy and the ground covered with snow the squirrels sometimes remain in the hibernation nest

for some days. This is especially so with the old males. If, however, spring is early and they happen to come from hibernation on ground destitute of vegetation, as in fields which have been plowed since they went into æstivation, they will leave very shortly, sometimes travelling some distance to a large summer den located in wild grass or sod.

WILDNESS OF HIBERNATING SQUIRRELS.—Throughout all the investigation of the Columbian ground squirrels it has been noticed that they are very shy and wild for a week or two before going into æstivation and again for about the same length of time after coming from hibernation. They are also very silent at these times, appearing instinctively to avoid attracting attention. They are observed slipping stealthily through the grass and not exposing themselves much to view and when they go into their dens they do not appear again for some time, often not coming up again while you remain. So, too, in the spring the first squirrels of the season are very shy, disappearing before you at a distance of 80 yards.

Here are expressed, very briefly, the facts of æstivation and hibernation of this animal, showing in a striking way the conformity of its life to meet the needs of its environment. Truth is stranger than fiction.

OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS*

(Continued from page 55)

BLACK DUCK, No. 296,117, banded by H. S. Osler, at Lake Scugog, Ontario, on September 11, 1923, was killed at a place four miles from Bobcaygeon, Ontario, on October 9, 1923.

BLACK DUCK, No. 296,118, banded by H. S. Osler, at Lake Scugog, Ontario, on September 11, 1923, was killed in Pigeon Creek, twelve and one-half miles from Peterborough, Ontario, about November 15, 1923.

BLACK DUCK, No. 296,146, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was shot on the Sassafra River, Kent County, Maryland, on January 29, 1924.

BLACK DUCK, No. 296,148, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was shot in the same vicinity on November 2, 1923.

BLACK DUCK, No. 296,154, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was killed on Chincoteague Island, Virginia, on January 10, 1924.

BLACK DUCK, No. 296,174, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was killed in the same vicinity on October 8, 1923.

BLACK DUCK, No. 296,177, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17,

1923, was shot on Sturgeon Lake, near Lindsay, Ontario, on October 21, 1923.

BLACK DUCK, No. 296,184, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was shot in East Lake, Prince Edward County, Ontario, on November 8, 1923.

BLACK DUCK, No. 296,185, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was shot in Gull Marshes, Hog Island Bay, Virginia, on January 16, 1924.

BLACK DUCK, No. 296,189, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was killed on the Tennessee River, near Rockwood, Tennessee, on January 17, 1924.

BLACK DUCK, No. 296,203, banded by H. S. Osler, at Lake Scugog, Ontario, on September 18, 1923, was shot near the narrows, between Lakes Simcoe and Couchiching, Ontario, about November 1, 1923.

BLACK DUCK, No. 296,213, banded by H. S. Osler, at Lake Scugog, Ontario, on September 19, 1923, was killed at Nixon, Ontario, on October 30, 1923.

BLACK DUCK, No. 296,227, banded by H. S. Osler, at Lake Scugog, Ontario, on September 20, 1923, was shot in Currituck Sound, North Carolina, on November 12, 1923.

BLACK DUCK, No. 296,235, banded by H. S. Osler, at Lake Scugog, Ontario, on September 20, 1923, was shot on the Detroit River, eight miles from Lake Erie, on October 13, 1923.

*Published by authority of the Canadian National Parks Branch, Department of the Interior, Canada.

BLACK DUCK, No. 296,236, banded by H. S. Osler, at Lake Scugog, Ontario, on September 20, 1923, was shot on Long Point Marsh, Lake Erie, on November 8, 1923.

BLACK DUCK, No. 296,245, banded by H. S. Osler, at Lake Scugog, Ontario, on September 20, 1923, was killed in Banana Creek marshes, seven miles east of Titusville, Florida—no date given, but reported on December 17, 1923.

BLACK DUCK, No. 296,255, banded by H. S. Osler, at Lake Scugog, Ontario, on September 21, 1923, was shot on what is known as Money Island, of the Group of Fire Islands, New York, on December 21, 1923.

BLACK DUCK, No. 296,259, banded by H. S. Osler, at Lake Scugog, Ontario, on September 21, 1923, was killed in Banana Creek marshes, seven miles east of Titusville, Florida—no date given, but reported on December 17, 1923.

BLACK DUCK, No. 296,269, banded by H. S. Osler, at Lake Scugog, Ontario, on September 21, 1923, was shot at Minden, Ontario—no date given, but reported on October 27, 1923.

BLACK DUCK, No. 296,275, banded by H. S. Osler, at Lake Scugog, Ontario, on September 22, 1923, was shot in a small marsh just east of Valentinia, on Lake Scugog, Ontario, about October 25, 1923.

BLACK DUCK, No. 296,276, banded by H. S. Osler, at Lake Scugog, Ontario, on September 22, 1923, was shot in the same vicinity, during the first week of October, 1923.

BLACK DUCK, No. 296,277, banded by H. S. Osler, at Lake Scugog, Ontario, on September 22, 1923, was killed on the Combahee River, South Carolina, on January 16, 1924.

BLACK DUCK, No. 296,284, banded by H. S. Osler, at Lake Scugog, Ontario, on September 22, 1923, was killed on the James River, Virginia, twenty miles east of Lynchburg, on December 7, 1923.

BLACK DUCK, No. 296,287, banded by H. S. Osler, at Lake Scugog, Ontario, on September 23, 1923, was killed near Wachapreague, Virginia, about January 30, 1924.

BLACK DUCK, No. 296,294, banded by H. S. Osler, at Lake Scugog, Ontario, on September 23, 1923, was shot at Rushtown, Ohio, on December 8, 1923.

BLACK DUCK, No. 296,295, banded by H. S. Osler, at Lake Scugog, Ontario, on September 23, 1923, was killed near Troy, Alabama, on November 20, 1923.

BLACK DUCK, No. 296,301, banded by H. S. Osler, at Lake Scugog, Ontario, on September 23, 1923, was shot on the Cooper River, at Oakley, South Carolina, on December 28, 1923.

BLACK DUCK, No. 296,302, banded by H. S. Osler, at Lake Scugog, Ontario, on September 23, 1923, was shot in the same vicinity, on October 27, 1923.

BLACK DUCK, No. 296,315, banded by H. S. Osler, at Lake Scugog, Ontario, on September 24, 1923, was killed in Currituck Bay, North Carolina, on November 5, 1923.

BLACK DUCK, No. 296,339, banded by H. S. Osler, at Lake Scugog, Ontario, on September 25, 1923, was killed in Back Bay, Virginia, on January 25, 1924.

BLACK DUCK, No. 296,340, banded by H. S. Osler, at Lake Scugog, Ontario, on September 25,

1923, was killed in Dorchester County, Maryland, on January 30, 1924.

BLACK DUCK, No. 296,343, banded by H. S. Osler, at Lake Scugog, Ontario, on September 25, 1923, was shot in Star Bay, at the north end of Lake Scugog, Ontario, on October 19, 1923.

BLACK DUCK, No. 296,344, banded by H. S. Osler, at Lake Scugog, Ontario, on September 25, 1923, was shot at Apex, Missouri, about November 17, 1923.

BLACK DUCK, No. 296,355, banded by H. S. Osler, at Lake Scugog, Ontario, on September 27, 1923, was "Found" at Shawneetown, Illinois, on February 8, 1924.

BLACK DUCK, No. 296,361, banded by H. S. Osler, at Lake Scugog, Ontario, on September 27, 1923, was killed on the Chariton River, near Aholt, Missouri, on November 3, 1923.

BLACK DUCK, No. 296,373, banded by H. S. Osler, at Lake Scugog, Ontario, on September 27, 1923, was killed near Huntsville, Alabama, on December 20, 1923.

BLACK DUCK, No. 296,374, banded by H. S. Osler, at Lake Scugog, Ontario, on September 27, 1923, was killed on Currituck Sound, North Carolina, on November 2, 1923.

BLACK DUCK, No. 296,376, banded by H. S. Osler, at Lake Scugog, Ontario, on September 27, 1923, was shot at Brighton Bay, Lake Ontario, on October 20, 1923.

BLACK DUCK, No. 296,378, banded by H. S. Osler, at Lake Scugog, Ontario, on September 27, 1923, was shot near Frasierville, Ontario, during the month of November, 1923.

BLACK DUCK, No. 296,379, banded by H. S. Osler, at Lake Scugog, Ontario, on September 27, 1923, was killed near Lafitte, Louisiana, on January 29, 1924.

BLACK DUCK, No. 296,393, banded by H. S. Osler, at Lake Scugog, Ontario, on September 28, 1923, was killed on the marshes near Delaware City, Delaware—no date given, but reported on December 1, 1923.

BLACK DUCK, No. 296,424, banded by H. S. Osler, at Lake Scugog, Ontario, on September 29, 1923, was killed in Black Creek, Baldwin County, Alabama, on November 27, 1923.

BLACK DUCK, No. 296,427, banded by H. S. Osler, at Lake Scugog, Ontario, on September 29, 1923, was killed at Presque Isle Peninsula, Erie, Pennsylvania, on November 21, 1923.

BLACK DUCK, No. 296,428, banded by H. S. Osler, at Lake Scugog, Ontario, on September 29, 1923, was killed at Morriston, Florida, on November 30, 1923.

BLACK DUCK, No. 296,437, banded by H. S. Osler, at Lake Scugog, Ontario, on September 30, 1923, was shot at King's Bay, Lake Scugog, Ontario, on October 25, 1923.

BLACK DUCK, No. 296,442, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was shot at a place two miles south of Crosswell, Michigan—no date given, but reported on November 5, 1923.

BLACK DUCK, No. 296,444, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was killed at Wellington, Missouri, on October 26, 1923.

(Continued in the May issue)

IN MEMORIAM

ANDREW WALKER FLECK

Born October 16th, 1845

Died May 6th, 1924

On May 6th, 1924, the daily papers published notices of the death of Andrew Walker Fleck. These notices voiced the sorrow of the community at the passing of an honorable and public spirited citizen; they told of his birth in Montreal on October 16th, 1845, of his marriage to a daughter of J. R. Booth, of the many interests he shared with his father-in-law; they dwelt upon the splendid public spirit that placed him first in all that was best in the charitable and philanthropic work of Ottawa; they told, what his friends sadly realized, what an irreparable loss this work had sustained in his death.

Much as was known of Mr. Fleck's work for the public good, there was much more that was not known, for he went about his mission quietly, drawing as little attention to himself as possible, and there is much that will never be written of his usefulness.

Perhaps few knew Mr. Fleck as a naturalist, yet such he was, in the very truest sense of the word. Not, perhaps, a scientist, but a naturalist in the appreciation of all that is beautiful in nature, for no man without this appreciation could have had a garden such as was his delight; Nature gave his garden a beautiful setting—he gave it care and thought and made it a perfect thing

with its glory of bloom, its bird houses filled with busy guests, its pool fed by a bubbling spring where goldfish flashed and floated. But in this, as in all else, he was generous. His interest in nature was not a selfish hobby, for he was one of the small number of men who, by their interest and continued support, gave to Canada a society which from an inconspicuous local organization has grown into a nation-wide body—the Ottawa Field-Naturalists' Club. Mr. Fleck was one of the early members, having joined in 1899.

Canada owes a great deal to the men who, while not definitely following the natural sciences themselves, have still given their countenance and influence in support of the early endeavours of organizations engaged in teaching, recording and observing the history of nature. Besides the firm foundations laid for later progress, the older records of our Club contain accounts of Canadian Natural History as at a time long since changed and the club sees these old friends of its youth pass on with the deepest regret.

Mr. Fleck is survived by his wife; two sons, Messrs. Gordon Fleck and Bryce Fleck of Vancouver, B.C.; two daughters, Mrs. W. D. Herdridge,* of Ottawa, and Mrs. Gregor Barclay, of Montreal; and one brother, Mr. James G. Fleck, of Ottawa.—H. L.

*Died March 18, 1925

NOTES AND OBSERVATIONS

Stachys germanica L. IN CANADA.—On July 11, 1924, upon my arrival at the Boy Scout Camp on the shore of Mink Lake, between Douglas and Eganville, Ontario, almost the first plant to arrest my attention was the one named above. At a distance of a few yards the white, felty leaves and stems might have passed for those of the common mullein, but for the different aspect of the plants. The first specimens, seen growing in the shade of the camp site, were scarcely in flower, but it was obvious that they must be Labiates; and, that being granted, it was far from obvious to me what might be the species. Hasty reference to my "Gray" failed to locate such a plant, for the sufficient reason that it is not included in that *Manual*; so I had to face the boys, "stumped" by my first difficulty.

Subsequent reference to Britton & Brown's *Flora*, backed by consultation of European works with the assistance of Dr. M. O. Malte, established the identity of the plant. It is included in the

above *Flora* on the sole strength of occurrence on "Roadsides near Guelph, Ontario". The herbarium of the Victoria National Museum was found to contain a specimen from that locality collected by W. C. McCalla, August 27, 1897.

Further information on the occurrence of *Stachys germanica* at Guelph appears in a note by the late T. J. Moore, of Guelph, in the *Ontario Natural Science Bulletin*, No. 2, 1906, page 47, which may be quoted in full.

"As Guelph is, I believe, the only station known in America for *Stachys germanica* L. (Mouse-ear) it appears to me that some notes on its distribution here might be of interest.

"It was first observed near the stables at the B.A.C. in 1895 by Prof. M. W. Doherty, and was first recorded in the appendix to Vol. III of Oritton & Brown's *Illustrated Flora*, published in 1898.

"It has now spread some three miles south-east, four miles south, and three miles west, and is a

bad weed in pastures and along the roadside."

More recently, according to Paul C. Standley, writing in *Rhodora* for July, 1920, "*Stachys germanica* L., has been found on ballast in the eastern United States."

At Mink Lake this interesting plant was found to have spread over many acres of rocky pasture land which had evidently been part of an inhabited clearing in the forest at one time. It is well established here, indicating that it could be an aggressive weed. Fortunately, it is isolated from farming country by the lake and by tracts of wooded land.

Stachys germanica was planted in the Central Experimental Farm Botanic Garden in 1897, and proved hardy, but has not been kept. It is quite probable that it has been similarly planted in other places; and that the two infestations known, and perhaps others not brought to our attention, have arisen in this way. Parts of Renfrew County, including the neighborhood of Eganville, received Central European immigration, during the last century, which might well have brought along for planting a species such as this.

A strikingly similar European species, *Stachys lanata* Jacq., is also represented in the National Herbarium, Ottawa, by one specimen, collected in Sydenham Township, Ontario, by W. R. McColl of Owen Sound.

The article in *Rhodora*, quoted above, reports this occurrence near Owen Sound, stating that it "has perhaps not been reported previously from North America, although no thorough search of literature has been made for verification of this point." In the same article Newton Tripp, of Forest, Ontario, is credited with finding a specimen.

Stachys germanica is described in Britton & Brown's *Flora* as an erect annual, one to three feet high, simple or somewhat branched. Its best field mark of distinction from our other Woundworts is its densely villous covering throughout. The basal leaves are also characteristically oval in outline.—HERBERT GROH.

Segmentina crassilabris Walker IN MANITOBA.—The discovery of the snail, *Segmentina crassilabris* Walker², in two Manitoban localities is of some interest, since it extends the known distribution of this species into the Hudson Bay drainage system.

This species was first taken by me at Waugh, Man., the eastern terminus of the G.W.W.D. Ry., which is situated on Indian Bay, a few miles west of the Ontario boundary. Indian Bay forms part of Shoal Lake, the waters of which flow into the

Lake of the Woods. My field notes regarding this species are as follows, "*Segmentina* found on underside of pieces of driftwood, near mouth of Falcon River, water six inches deep, sand bottom." At this point the water has the color of very weak tea, due presumably to the presence of extracts of decaying vegetation.

S. crassilabris was also obtained from a small pond in St. Vital, a suburb of the city of Winnipeg, in April, 1924. In this pond it was associated with *Planorbis umbilicatellus* and *Lymnea palustris*.

Walker (*loc. cit.*) described the types of *crassilabris* from Hamtramck, Wayne Co., Michigan, and also reported the following localities: Muscatine, Ia.; Knox Co., Vincennes, and Brunston, Ind.; Munroe and Kent counties, Michigan. Walker³ has also reported it from Charity Island, Lake Huron. Adamstone¹ found it a rare shell in Lake Nipigon, Ontario. It is of interest to note that Whittaker⁴ did not find this species in the Mackenzie River district, although the related and equally inconspicuous *S. armigera* and *S. christyi* were both found. Winslow⁵ also failed to obtain it in North Dakota. Thus *S. crassilabris* has up to the present time been obtained in the Mississippi, St. Lawrence (Canadian), and Hudson Bay drainage systems. In order to establish the identity of this species beyond doubt, I submitted it to Dr. Bryant Walker, to whom I wish to express my thanks.—ALAN MOZLEY.

NESTING OF RICHARDSON'S OWL.—On the 11th April, 1924, the writer discovered a nest of the Richardson's Owl on one of the smaller islands of the Grand Manan (New Brunswick) group. This island is approximately three miles long and has an average width of about one-half a mile and is largely covered with a growth of thick, stunted spruces, gnarled and twisted from many years of exposure to the elements.

Several acres of the more fertile parts of the island have been converted into hay-fields where the run-ways of innumerable field-mice were noted and it seems highly probable that these attracted the small Owls which, it was reported to me, have frequently been seen on this particular island for many years.

For the most part the land is very low-lying and the highest ridges would not be more than twelve feet above sea level. It was on one of

²Walker, Bryant. *Results of the Mershon Expedition to the Charity Islands, Lake Huron, Mollusca*, Occ. Prs. Mus. Zool. Univ. Mich. No. 7, 1915, pp. 1-7.

¹Adamstone, F. B. *The Distribution and Economic Importance of Mollusca in Lake Nipigon*. Univ. Tor. Biol. Studies, No. 22, pp. 67-119, 1923.

⁴Whittaker, E. J. *Freshwater Mollusca from Mackenzie River Basin, Canada*. Nautilus, XXXVII, 1924, pp. 8-12.

⁵Winslow, M. L. *Mollusca of North Dakota*. Occ. Prs. Mus. Zool. Univ. Mich., No. 98, 1921, pp. 1-18.

²Walker, Bryant. *A New Species of Segmentina*. Nautilus, XX, 1907, pp. 122-124.

these ridges, in an old and much decayed stump, where a pair of Flickers had at one time held forth, that the Owls had made their home, about ten feet from the ground and close to the top of the stump. At the first tap the hole was quickly and completely filled by the grey face of the bird peering down at me with slowly blinking eyes. A second thump caused her to vacate the nest. This she accomplished, however, with difficulty, since the fit was a tight one and she was obliged to hitch from side to side before getting clear. She then flew to a perch about 20 feet away where she sat nervously watching proceedings, but uttering no note. The nest cavity was about ten inches deep and considerably enlarged at the base, which was covered with a thick bed of soft decayed wood and feathers, well matted. Here were deposited five much soiled eggs, typical of the Owl tribe as to shape and but slightly incubated. After the eggs were collected and the writer had withdrawn a few yards, the female returned to the nest and for some moments was seen clinging to the entrance by her feet and fluttering there in a manner which suggested a gigantic moth. Finally, after considerable effort, she was able to squeeze in and was last seen peering from the hole just as though nothing had happened. The male bird was not seen. The ground about the nest tree was examined for pellets but none were discovered and during our stay on the island, which lasted several hours, only one was found and this contained the fur, bones and skulls of some small rodents. The measurements in inches of the eggs were as follows: 1.28 x 1.07, 1.31 x 1.06, 1.32 x 1.07, 1.33 x 1.07, 1.27 x 1.07.—R. W. TUFTS.

A SECOND RECORD OF THE SCISSOR-TAILED FLYCATCHER AT YORK FACTORY, MANITOBA.—For many people the fascination of bird study rests in the uncertainty of it. Birds, in spite of their enormous powers of flight, usually belong to certain territory and it is only there that they can be expected. But occasionally a wandering spirit, storm, or unknown cause sends a bird far from its usual range. Bird students who would instantly recognize strange species are not numerous and many such wanderers must perish without their aberrant journeyings being known. The Scissor-tailed Flycatcher is a very striking bird, breeding from Southwestern Missouri to Western Texas. Mrs. Bailey puts emphasis on the length of his tail as the outstanding feature, as one would expect. She says:

"Discovering him first perched on the chaparral you are struck by his long white tail and glistening black, white, and salmon plumage. In perching, the tail is closed thin, and the black of the wings contrasts well with the bright salmon sides. He sits quietly

like any every-day bird, giving only an occasional bee-bird like note, till suddenly up he darts into the air, and with delighted wonder you watch his odd figure and odder gyrations in the sky."

Truly the following is a strange record from the shores of Hudson Bay:

Mr. A. Brabant, Fur Trade Commissioner, Hudson's Bay Company, Winnipeg, recently forwarded a skin of the Scissor-tailed Flycatcher (*Muscivora forficata*) to Mr. J. B. Harkin, Commissioner, Canadian National Parks, with the statement that the bird had been found frozen to death near York Factory after a slight frost on October 2, 1924. Mr. Brabant, in his letter, quotes from the communication received from the Company's manager at York Factory, Mr. C. Harding, who says "no similar bird has ever been seen by the natives in these parts". Mr. Harding not only saved this interesting specimen as a creditable bird skin, but also identified his find. It is certainly a strange coincidence that a second bird of this species should be reported from the shores of Hudson Bay, and even more odd that it should be from the same place where one was taken in 1880. This previous York Factory occurrence is recorded by Professor Robert Bell in his *Notes on the Birds of Hudson's Bay* (*Proc. & Trans. of the Royal Soc. of Can.*, Vol. I, Sec. IV, 1882, p. 52) in the following words: "But the most singular discovery in regard to geographical distribution is the finding of the Scissor-tail, or Swallow-tailed Flycatcher (*Milvulus forficatus* Sw.) at York Factory. The specimen in the Government Museum was shot at York Factory, in the summer of 1880, and I have learned since then that these remarkable birds were occasionally seen at the posts of the Hudson's Bay Company, all the way west to the valley of the McKenzie River."

This specimen is still in the National Museum, being No. 30 in the catalogue. Mr. C. W. Nash found one dead on the prairie, October 20, 1884, near Portage la Prairie (Seton, *Auk*, II, p. 218). In *The Ottawa Naturalist*, XIII, 1899-1900, p. 195, is an account of one seen July 6, 1899, six miles north of Winnipeg, Manitoba, by Mr. L. Osborne Scott. The only other Canadian records, so far as I am aware, are of accidental occurrences in Eastern Canada. This second York Factory specimen has been deposited in the Canadian National Museum.—HOYES LLOYD.

RECORD OF THE SCISSOR-TAILED FLYCATCHER FOR GRAND MANAN, NEW BRUNSWICK.—A beautiful specimen of the Scissor-tailed Flycatcher (*Muscivora forficata*) was taken at Whale Cove, Grand Manan, New Brunswick, on the 26th of

October, 1924, and brought to Mr. John R. Moses of North Head, Grand Manan.

The bird, a female of the species, was preserved and was examined by the writer at the home of Mr. Moses on the 20th of November, 1924. Reference to Macoun's *Catalogue of Canadian Birds* reveals the interesting fact that a Scissor-tailed Flycatcher was taken at Clarendon Station, Queens County, New Brunswick, on the 21st of May, 1906, by Mr. G. S. Lacey. It is believed that these two comprise the only records of the species in the Maritime Provinces.—R. W. TUFTS.

THE STARLING (*Sturnus vulgaris*) AT GUELPH, ONTARIO.—On March 23, 1924, seven Starlings appeared in Guelph, Ontario. Five of these moved on elsewhere and one pair remained to breed. They nested in an old Flicker cavity some forty feet up in a maple stub. There were two broods during the season. On the opposite side of the street a Screech Owl holed up during the day time, the Starlings not being in the least disturbed over the close proximity of this nocturnal chap. When the Flickers arrived, in April, they had quite a lively time while attempting to reclaim their old nesting-site, but their attempt was not successful.—ROBERT E. BARBER.

THE WHITE-FRONTED GOOSE IN ALBERTA.—During the last few years the White-fronted Goose (*Anser albifrons* subsp.?) has become a fairly regular fall migrant through Central Alberta. While it has not been reported in the spring migrations, it is possible that it returns via this route, although it could not be expected to be observed at that time of the year as readily as during the shooting season. Previous to the fall of 1922, these Geese were unknown to our oldest hunters, and they were unable to recall ever having seen them before.

On the 7th of October, 1922, twelve Gray Wavies, as they were called, were shot out of several flocks, near Beaver Lake, there being at least a thousand seen at that time. On the 14th of the same month, the writer secured two very fine birds out of a flock of about fifty, and observed during that day several other flocks, estimated to number 25 to 50 each. These Geese were feeding

in wheat fields which had been cleared of stooks, were in excellent condition, and decoyed as readily as do the Canada Geese. During the same month a considerable number were killed in the Sullivan Lake country. In 1923 they do not appear to have passed through in the same numbers, although a few were reported.

On the first of October, 1924, the writer, with two friends, killed four White-fronted Geese out of a flock of one hundred birds, on his farm, a few miles south of Camrose. These were feeding in a wheat field, amongst the stooks which had not as yet been removed. This is quite different from the habits of the Canada Geese, which rarely, if ever, feed among stooks, always selecting for feeding purposes fields which have been cleared. This is one instance where the White-fronts use less caution than do their larger relatives. While hunting at Manitou Lake, Saskatchewan, just across the border from Alberta, in the last week in October, 1924, the writer saw hundreds of White-fronted Geese, and secured seven one morning. One flock was unusually susceptible to decoying, and was called back over the pit three times, before it finally left the field.

The breast plumage of the White-fronted Goose varies exceedingly in color and form, no two of those which have the black blotches being exactly similar. The majority of those killed had only the pale gray breasts, and these all seemed to be the smaller birds. Would these latter be the birds of the year? Out of a considerable series of White-fronts weighed, the heaviest, a richly blotched bird, tipped the scales at six pounds and ten ounces. The plain-breasted birds averaged about five pounds each.

These Geese are known to migrate through Manitoba and eastern Saskatchewan regularly, and it would be interesting indeed to know for what reason they have changed their usual course five hundred miles during recent years.—FRANK L. FARLEY.

NOTE—*The Canadian Field-Naturalist* is much indebted to Mr. P. B. Philipp for meeting the expense of publishing the illustrations accompanying his paper in this issue.—Editor.

BOOK REVIEW

BIRDS AND MAMMALS OF THE SKEENA RIVER REGION OF NORTHERN BRITISH COLUMBIA.

By Harry S. Swarth. *University of California, Publications in Zoology*, Vol. 24, No. 3, pp. 315-294, Plates 9-11, 1 figure in text. Univ.

of Cal. Press, Berkeley, Cal., 1924.

This is another of the admirable faunal papers from the painstaking pen of Mr. Swarth, published under the auspices of the Museum of Vertebrate Zoology, University of California. It is one of a series of Northwest Coast brochures made possible

through the generosity and interest of Miss Annie Alexander.*

The work upon which this publication is founded was performed from May 25 to September 26, 1921, in the neighborhood of Hazelton, British Columbia, by Mr. Swarth and Mr. Wm. D. Strong. Hazelton is roughly as the Crow flies about 130 miles northeast of Prince Rupert, on the National Transcontinental line, latitude about 55°15' North and, except in Alaska, the most northern railroad point on the continent, being about on a line with the mouth of James Bay.†

The scope and treatment of the work is indicated by the division headings. Introduction, consisting of personnel of party and acknowledgements; Itinerary and Description of Localities; Zonal and Faunal Position of the Skeena Valley; Check-List of the Birds; General Accounts of the Birds, an annotated list, giving critical accounts of relationships and occurrences; Check-List of the Mammals; General Accounts of the Mammals, similar to those of the birds; and Literature Cited.

No very revolutionary discoveries are made. On the whole, the author finds upper Skeena fauna and flora to be of the interior rather than of the coast type, though certain coastal species occur farther inland here than in the Stikine Valley, the locality most likely to be compared with it. It is slightly more humid, but in many respects similar to that valley.

Some interesting occurrences are noted and the ranges of several forms and species extended. Fleming's Grouse (*Dendragapus obscurus flemingi*) extends this far south. The Willow Ptarmigan is referred to *alexandrae* and a Rock Ptarmigan, the female with a tail white at the base like that of *Lagopus hyperboreus* of Spitzbergen, is described and figured but not named. An interesting point brought out is that within a small area within this locality are found six species of Grouse—Ruffed, Blue and Franklin's and three Ptarmigan, an association that has heretofore not been equalled in this country. Both Eastern and Western Goshawks were taken and Eastern and Black Pigeon Hawks, the latter marking a considerable northern extension of range. The Vaux's Swift is probably also a northern record. Two Eastern Kingbirds were taken. A Red-winged Blackbird is referred to *arctolegus*. Strangely enough, Brewer's Blackbird is absent and its place is taken by the Rusty, a species from the east. The most northern record of the Evening Grosbeak (*brooksi*) was also made.

*Others in the series have dealt with the fauna of the Alaskan coast, Vancouver Island and the upper Stikine River. A review of the latter is to be found in these pages, Vol. XXXVII, 1923, pp. 32-4.

†A short list of the summer birds of this same region has previously been published by Taverner, *Condor*, XXI, 1919, pp. 80-86.

The Purple Finch is the eastern form. All three Longspurs were secured. For Smith's Longspur it is the second record for the province, for the Chestnut-collared it is the first. A White-throated Sparrow is a notable occurrence. Three forms of Junco were collected. Mr. Swarth refers the breeding bird to *shufeldti* and migrants to *hyemalis* and *connectens*; the latter as defined in his *Birds of the Stikine River*. The Eastern Fox Sparrow was taken for the second time in the province but *allivagans* is given as the breeding form. A Catbird and a Western House Wren form northern records for their respective species. The Brown-headed Nuthatches he refers to *columbianus*.

The typographical and general appearance of this report is up to the usual high standard of the series and denotes careful work on the part of author, printer and proof-reader. The stock and workmanship show no lowering of quality, even in these days of high printing costs.—P. A. T.

Field notes and critical notes on taxonomy are given for the 21 species of small mammals listed, based on 265 specimens collected. The expedition was hardly far enough afield to be in the big game country, and the larger fur-bearers are difficult to observe at the season when the field operations were carried on, consequently only a few of the larger mammals are casually mentioned in the introduction.—R. M. A.

THE AUK, April, 1924

NESTS AND NESTING HABITS OF THE AMERICAN EAGLE. By Francis H. Herrick, pp. 213-231, continued pp. 389-422 and 517-541.

This is a very complete and intimate study, well illustrated with photographs, of the nesting of a pair of Bald Eagles. A most important paper to any one who is studying this species.

NESTING RECORDS OF THE WANDERING TATTLER AND SURF-BIRD IN ALASKA. By Olaus J. Murie, 3 plates, pp. 231-237.

Gradually we are getting exact data on the nesting areas of these birds, which have so long eluded us. It has long been felt, through a process of elimination, that they must nest in the mountain interior of Alaska. Our suppositions are being verified. In the summer of 1923 nests and eggs of the Wandering Tattler were found on gravel bars along small tributaries of the Tenana River, near Fairbanks, directly north of Prince William Sound. The exact locality is difficult to place on the map unless one is very familiar with Alaska or has maps that are more detailed than those generally accessible and it would be very helpful if authors who refer to such out-of-the-way places would state their latitude and longitude.

The nest of the Surf-bird was not found but downy young were taken, July 21, 1921, on McKinley Creek, a tributary of the Middle Fork of Forty-mile River, a little south of where the Yukon River crosses the International Boundary, and July birds were seen in the same and other years at the head of the Savage River and between "upper Chena and Chatanika waters", near Fairbanks.

A VISIT TO TOM LINCOLN'S HOUSE WITH SOME AUDUBONIA. By Charles W. Townsend, pp. 237-242.

The principal Canadian interest in this paper, outside of its connection with Audubon, in whom all American ornithologists are interested, is in the fact that it was Tom Lincoln who first discovered Lincoln's Sparrow, near Natashquan, on the north shore of the Gulf of St. Lawrence, then officially as well as popularly known as "The Labrador", and after whom it was named. The paper contains some interesting side lights on the Labrador trip—amongst them an amusing quotation of Lincoln's describing the great Audubon as "... a nice man but Frenchy as thunder."

RECOGNIZING INDIVIDUAL BIRDS BY SONG. By Aretas A. Saunders, pp. 242-259.

An interesting study of individual variation in bird songs. There is given a method of graphically representing bird songs that appears to have prospects of usefulness even to those without musically trained ears.

A STUDY OF THE HOME LIFE OF THE NORTHERN PARULA AND OTHER WARBLERS AT HATLEY, STANSTEAD COUNTY, QUEBEC, 1921-1922. With two plates of nests. By Henry Mousley

A very interesting study of the nesting of a number of Warblers that goes to confirm our belief that we have here in Canada a high authority on Warbler nesting habits.

PECULIAR BEHAVIOR OF THE SPOTTED SANDPIPER (*Actitis macularia*). By L. L. Snyder, pp. 341-342.

Records of the species perching on so small a support as a telegraph wire and swimming to avoid danger.

On page 342, Arthur T. Wayne records Great Horned Owls killing Barn Owls. Apropos of this, one of the best methods of attracting Owls within gun range at night is to imitate the call of the next weaker species. It will sometimes work even when their own calls fail to lure. They come to it with a vigor that leaves little doubt as to their immediate intention. It is interesting to note that nearly every wooded coulee of any extent in the Canadian prairies contains at least a pair of Long-eared Owls—unless a Great Horned Owl there holds

forth, in which case there is little chance of finding any smaller Owl resident in the area.

Dr. John C. Phillips's *Natural History of the Ducks, Part II*, is reviewed on pp. 358-359 at considerable length and with nothing but well-merited praise. This volume contains many of our native species and pictures by our countryman, Major Allan Brooks, are well represented among the illustrations. Perhaps no work ever before contained as much accurate and detailed information on the Ducks of any limited locality as this does on those of the world. That the name for the Mallard is given in some forty-five different languages illustrates the amount of research that has been put into these pages. The only shadow over the picture is the price—fifty dollars a volume—which places the work beyond the means of many who could make good use of it. Much of this expense is inevitable in the thorough presentation of the subject but a large part is due to the sumptuousness that makes a beautiful book, satisfying to aesthetic appreciation, without adding to its working value.

Wetmore's *Food and Economic Relations of North American Grebes*, U.S. Dept. of Agriculture, Department Bulletin No. 1196, 1924, pp. 1-24, is briefly reviewed on pp. 369-370, as is Casey Wood's *Birds of Fiji*, Handbook of Fiji, 1924, on p. 371. In the latter paper it is noted that the introduced Myna, closely related to the Chinese Starling, lately established in British Columbia, is a serious enemy of the native birds.

On p. 372 is an appreciation of Dr. John D. Tothill's work on the relation of birds to the Fall Webworm, published in Bull. 3, n.s., Dominion Dept. of Agriculture, Ottawa, 1922, 107 pp. The Red-eyed Vireo is given an astonishingly high place among the factors controlling these pests, as it was found to destroy from 11.4 to 89.5 per cent of the broods. Dr. Tothill decided that birds are of greatest importance when the insects are scarce and of least value when they are most abundant.

A paper on heterochrosis in the Crimson-breasted Parrot, by Casey Wood, published in *The Emu*, is noted.

On p. 383 is a letter by Allan Brooks taking exception to a denial, made by Ludlow Griscom in a recent paper, that the sex plumages of the Black Swift are similar in the adult. Major Brooks states that in some fully adult specimens the sexes are exactly alike, both in the lack of white feather edges below and in the emargination of the tail. A letter to the same effect by H. S. Swarth follows that of Major Brooks. Both of these authorities have had very ample experience with the species and their word must be regarded as final.

An obituary of Napoleon Alexander Comeau, the naturalist of the North Shore, whose death was noted in these pages before, appears on pp. 387-388.—P. A. T.

HISTORIES OF NEW FOOD-FISHES, *Bulletins of the Biological Board of Canada, Nos. I-IV, 1918-20; 80 pp., Illustrated.*

This series comprises short popular monographs on Canadian fishes of economic value, but hitherto little considered by the fisherman or consumer, owing to the abundance of more marketable species along our Atlantic Coast. As these latter, however, owing to intensive fishing, decrease in numbers and size, or, owing to their migratory habits, occasionally fail to appear at the different localities, it is important to utilize other species, which are really obtainable in large quantities, but which at present are taken only as by-products, during the fishing for Cod, Herring, Mackerel, etc., along our coasts, and are generally discarded; or for which no fishery at all has been made up to the present time, though in European waters their value is fully appreciated, both by the fisherman and by the ordinary consumer. There they find a ready market, chiefly in a salted or smoked state, owing to their generally fairly large size. Though Canadian and Alaskan waters are undoubtedly some of the most important fishing-grounds in the world, and rich in variety, the number of fish species considered of commercial importance here is surprisingly small, and the fishery is limited to them. The Indians along the American Pacific, the Eskimos and other Arctic tribes, and the coastal fisherman of northern and western Europe have long shown the way to utilize the many edible and nourishing products of the sea, besides the few species bringing the highest prices sought for by white fishermen in America. A number of the fishes of economic value occur on both sides of the Atlantic and the Pacific, particularly towards the north, both the ones of prime commercial importance at present, and a host of others so far little considered in America.

It is for the purpose of calling attention to these latter ones, some of which may one day become as important to our fishermen as are now the Halibut,

the Lobster, or the Oyster, that these *Histories of New Food-Fishes* are published.

The first Bulletin in the series deals with the Canadian Plaice (*Drepanopselta platessoides*), or Long Rough Dab, and is by the Director of the Atlantic Biological Station at St. Andrews, N.B., Dr. A. G. Huntsman. The second is written by Prof. P. Cox, of the University of New Brunswick, and treats of the Lump-sucker (*Cyclopterus lumpus*). The third is by Prof. W. A. Clemens, now Director of the Pacific Biological Station at Nanaimo, B.C., and deals with the Rock-eel or Mutton fish (*Zoarces anguillaris*); while the fourth bulletin, by Prof. C. J. Conolly, of Antigonish, N.S., describes the Angler or Frog-fish (*Lophius piscatorius*). The more detailed, scientific accounts of the fish-species treated in these *Histories of New Food-Fishes*, will be found in *Contributions to Canadian Biology*, already reviewed in *The Canadian Field-Naturalist*.

Each one of these four Bulletins is well supplied with illustrations, as plates or in the text, showing the distribution, growth, and appearance of the particular species, from the egg and the larva up to the adults. The text is subdivided into suitable short chapters on the different subjects discussed in connection with each fish: as their popular names in Europe and America; the systematic characters; occurrence along the different coasts; capture and economic value; spawning and development; habits, food, parasites, etc., according to our present knowledge. As the four species represent both deep water and coastal forms; both viviparous and egg-laying species; species depositing their eggs among rocks and sea-weed along the shore, and species having floating (pelagic) eggs, these accounts of merely four fishes show the great variety in their natural history, and the importance of a proper understanding of the natural history of each species in its economic utilization. Furthermore, each bulletin is written in a style both plain and interesting; contains original data secured in Canada, and deals mainly with the life-history along our own coasts. These *Histories of New Food-Fishes* may be had for 10 or 15 cents apiece, on application to the Biological Board of Canada.—F. J.

PUBLICATIONS RECEIVED.

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NOTES ON THE HERPETOLOGY OF POINT PEELE, ONTARIO

By E. B. SHELLEY LOGIER

Royal Ontario Museum of Zoology
Toronto, Ont.



IN *The Canadian Field-Naturalist* for September, 1919, Volume XXXIII, Number 3, pp. 60, 61, Mr. Clyde L. Patch gives a list of reptiles taken at Point Pelee, with some notes of observations and a short description of the general characteristic of the place. In closing his article he remarks: "As the foregoing is probably not a complete list of the reptiles of Point Pelee, additional records would be of interest".

During the summer of 1920, I was fortunate in having the opportunity to visit this interesting place where I spent about six weeks in field work with a party from the Royal Ontario Museum of Zoology, Toronto, and as a result will be able to add four species of reptiles to Mr. Patch's list and Mr. C. W. Nash has kindly furnished me with a fifth. I am able also to present a list of amphibians, nine species in all.

The first in the list, a *Urodele*, of which I found none, was taken by Mr. P. A. Taverner in 1915. and the record was sent me by Mr. Patch. The succeeding eight species are all *Anura* and were taken by myself while at the Point.

The attention which I was able to devote to the search for amphibians and reptiles was limited as much of my time was occupied in other work. It seems certain that a summer devoted to the herpetology of Point Pelee would add still more species to the list of both amphibians and reptiles. I was struck by the apparent absence of both newts and salamanders and believe that a more careful search would reveal at least a few besides the one species recorded below.

The marsh, with its open ponds, with bottom varying from clean sand to soft mud, sustaining so much aquatic vegetation and small animal life, should afford an ideal breeding place for the green newt and for several species of *Ambystoma* within whose range it occurs, and also a home for *Necturus*.

In the more densely wooded areas with their shady, moist conditions, and so rich in small insect life, one would expect to find the red-backed salamander at least fairly common, but none were found.

The apparent absence of wood-frogs was also more or less of a puzzle to me, for the conditions seemed to be good enough; the many temporary rain pools should serve—in rainy summers at any rate—to tide the species over the larval stage which is usually finished in July, and, these failing there is always water in the marsh which is fringed with woods on much of its western side.

Considering the geographic location of Point Pelee, its variety of landscape, its abundance of water and of sheltering vegetation, it should be an ideal place for many species of amphibians, so I have no doubt that the list herewith presented is far from complete.

AMPHIBIANS

1. TIGER SALAMANDER, *Ambystoma tigrinum* (Green).—One specimen was taken at Point Pelee by Mr. P. A. Taverner on October 2nd, 1915, but he does not recall the circumstances of the capture. This record, which was kindly supplied me by Mr. Patch, is the only one I know of of any kind of salamander from there.

2. AMERICAN TOAD, *Bufo americanus* Holbrook.—This species was common and generally distributed over the Point, being found in a variety of locations, in the woods, on farm lands, around the borders of the marsh, and under drift timber on the beach at the edge of the woods.

Their songs were sometimes heard in the evenings from the rainpools which were so numerous from the frequent showers of that humid, thundery summer. Along the sides of the wagon road which runs through from the east to the west beach, immediately south of Gardiner's property, were several of these pools which were more or less permanent in the early part of the summer, and the toads had resorted to them to breed. Here the tadpoles were seen in great numbers, but they were destroyed in multitudes by the drying of some of the pools before transformation was completed.

3. FOWLER'S TOAD, *Bufo fowleri* Garman.—Three specimens of this toad were taken late in the forenoon of July 1st, in the grass bordering the motor road on the west side of the point, just

outside Mr. Grubb's property. The three of them were very close together when discovered, all within about a square foot, disporting themselves in the bright sunshine and seemed to be very wide awake. At first sight they seemed different to the American toad by reason of their unusual coloration, and, on closer scrutiny, by the vertical profile of the snout; the rather slender, elongated and relatively straight parotoid glands which were not like the broad, and often somewhat kidney, shaped glands of the latter species; and by the smaller size of the warts, which numbered from two or three to seven or eight, in the black blotches on the back. In the American toad usually one or two warts are enclosed in any of these blotches. The ground colour between the blotches was of a greyish yellow, irregularly mottled with dusky greenish shade. The under parts of the throat, body and limbs were yellowish and without markings of any kind.

The general impression on viewing the toads from above, as when I first saw them on the ground, was that of uncommonly green toads. One of these specimens was later sent to E. R. Dunn, who confirmed my provisional identification of *Bufo fowleri*.

4. CRICKET FROG, *Acris gryllus* LeConte.—One specimen of this frog was found in the most southerly pond in the marsh.

On the afternoon of July 15th, while sketching beside this pond, my attention was caught by what to me was a new frog-note, and which sounded something like the tapping together of two pebbles. This call, which like the calls of our other diminutive frogs had considerable carrying power, was uttered intermittently, that is, the frog would call several times and then remain silent for a while. By following the sound I finally located the tiny producer, hiding among the rushes in the shallow water at the pond's margin. It dived when I attempted to capture it, but was dragged ashore in a net full of bottom trash. When landed it did not make for the water as frogs usually do, but took a few jumps further ashore as if in an effort to hide itself in among the shore vegetation. At the time of capture there were some rich emerald green blotches on the brownish ground colour of the back of this specimen, but, strange to say, these completely disappeared after a few weeks in captivity, although the little frog fed ravenously and seemed in the best of health. No more frogs of this species were taken or heard calling.

5. SPRING-PEEPEE, *Hyla crucifer* Wied.—Judging by the chorus, this frog was present in very considerable numbers in the swampy land and strip of woods on the east side of the Point just south of the marsh. In the twilight of damp or

rainy evenings, and frequently all through the night, especially in the early part of June, its shrill notes were incessant.

Two specimens were taken. One was found in the woods on the southern part of the Point on June 13th. The other one, taken on the 15th of June, was found snugly resting in a deserted caterpillar tent which served it as a hammock, suspended in the bushes. This was at the west side of the marsh and exposed to the full heat of the morning sun, and both the frog and the tent felt warm to the hand on grasping them.

6. COMMON TREE-FROG, *Hyla versicolor* LeConte.—This species was much in evidence by its voice, although not frequently seen. Its brief, trilling notes could usually be heard mingled with the nightly chorus of *Hyla crucifer*. Two specimens were taken, these were found in the daytime hiding in a small well composed of a buried barrel with the top open.

7. LEOPARD-FROG, *Rana pipiens* Schreber.—This was the most abundant *Rana*; it was very plentiful in the marsh and was also found wandering up over the farmlands which were more or less moist from the frequent rains of that summer.

8. GREEN FROG, *Rana clamitans* Latreille.—Not as plentiful as the Leopard Frog, but no doubt the next most abundant *Rana*. Common in the marsh, but I have no distinct recollection of having found it anywhere else on the Point.

9. BULLFROG, *Rana catesbeiana* Shaw.—This species, residing in the more inaccessible parts of the marsh, was probably more plentiful than sight records would lead one to think. The lonesome booming call of at least a few individuals could be heard there any evening at twilight; but, considering that the latter part of June and first two weeks of July are the period of full chorus for this species at Ithaca, (Wright, 1914), and that Point Pelee would not differ very greatly from Ithaca in the advance of the season, the notes of the bullfrog were comparatively few on the evenings when I visited the marsh.

REPTILES

Mr. Patch's list of eleven species of reptiles no doubt includes all the forms (excepting the Pilot Snake) actually recorded from Point Pelee up to the date at which his article was published, i.e. September, 1919. His list is as follows*:

1. Blue-tailed skink, *Eumeces fasciatus* (Linné).
2. Hog-nosed snake, *Heterodon contortrix* (Linné).
3. Black racer snake, *Coluber c. constrictor* (Linné).

*The nomenclature which I am using is that of the second edition of Stejneger and Barber's Check List, 1923. This necessitates revising the generic names of the Blue-tailed skink and the Musk turtle. Mr. Patch, of necessity, having followed the earlier edition.

4. Fox snake, *Elaphe vulpina* (Baird & Girard).
5. Garter snake, *Thamnophis s. sirtalis* (Linné).
6. Rattlesnake, *Crotalus horridus* (Linné).
7. Musk turtle, *Sternotherus odoratus* (Latreille).
8. Snapping turtle, *Chelydra serpentina* (Linné).
9. Spotted turtle, *Clemmys guttata* (Schneider).
10. Blanding's turtle, *Emys blandingii* (Holbrook).
11. Painted turtle, *Chrysemys m. marginata* (Agassiz).

The rattlesnake recorded in this list was an old specimen measuring 56 inches in length. It was taken near the end of the Point in September, 1918, by Captain G. Wilkinson, and is now in the collection of the Victoria Memorial Museum, Ottawa. As this one was such an old specimen and as no others have been taken there in recent years, Mr. Patch is of the opinion that it was probably the last of its race.

Of the other species listed the black racer is the only one I did not find. One of the residents of the Point told me that this snake is more often seen early in the summer before the grass has grown tall in the marsh. The specimen recorded by Mr. Patch was taken in 1906 by Mr. P. A. Taverner. Mr. C. W. Nash, of the Ontario Provincial Museum, tells me that he has records of fifteen or sixteen specimens of this snake being taken in Essex County and at Point Pelee in 1913 and some years following. Some of these he himself collected, and some were taken by other persons and sent to him. He also tells me that all these specimens were of the blue or blue-green colouration, but that none of them showed any yellow on the ventral parts.

Green colouration is characteristic of the species in the more western reaches of its range. Cope (1898) writes: "Specimens from the west and southwest exhibit a more or less bright olive-green with the whole under surface greenish-white to bright yellow." "Transitions between the eastern black and the western green forms of this species are frequently met with in the region connecting the two habitats. Thus, in Michigan the species is generally of a bluish green or greenish blue tint above, and is known as the 'blue racer'."

Ruthven (1912a) speaking of this species, says: "Michigan specimens when adult usually uniformly dull bluish green above . . . Colour of ventral surface nearly always greenish or bluish white, although frequently tinged with yellow."

The "blue racer" is evidently the prevailing colour form of Western Ontario as it is of Michigan, and at present I know of no record of the black form from that part of the Province.*

Mr. Nash is of the opinion that records of black snakes from there may prove to refer to the Pilot

black snake (*Elaphe o. obsoleta*) of which he has several records from Essex County. The racer, by reason of its smooth scales, may be readily distinguished from the pilot snake in which the scales are keeled.

To the above list I can add the following five species:

1. PILOT BLACK SNAKE, *Elaphe o. obsoleta* (Say.).—Mr. Nash has taken several examples of this snake at the base of the Point. A specimen measuring 6 feet 3 inches in length was taken there on November 2nd, 1915.

2. MILK SNAKE, *Lampropeltis t. triangulum* (Lacépède).—One individual of this species was found on June 14th, hiding in a hollow stump on the west side of the Point. The ground in this region was comparatively dry and not very thickly wooded, and deer mice and blue-tailed skinks, both of which enter into the diet of this snake, were plentiful.

3. COMMON WATER-SNAKE, *Natrix s. sipedon* (Linné).—Two specimens of this snake were taken at the marsh, one on the 24th and the other on the 25th of June. A few others were seen occasionally through the summer.

One of the individuals captured was an adult female, and in November following gave birth to a litter of 41 young while in captivity at the Museum, Toronto.

4. BROWN SNAKE, *Storeria dekayi* (Holbrook).—One adult specimen was found early in June. No others were seen.

5. MAP TURTLE, *Graptemys geographica* (Le Sueur).—One young specimen was taken in the marsh on July 16th, the carapace measured 94 mm.

GENERAL REMARKS

We found blue-tailed skinks very common in the lightly wooded and drier parts of the Point, they were most frequently found beneath the loose bark of dead stumps and logs. Most of those seen were either females or young individuals, only three old males with the characteristic coppery heads were found. Several of these skinks were brought back to Toronto alive and by the third of August about twenty eggs had been laid. None of these eggs hatched, owing to the unnatural conditions under which they were deposited and kept.

The females usually make individual nests in decayed logs and remain with their eggs until hatched.

Ruthven (1911) during his studies of the reptiles of Huron County, Michigan, found pregnant females as early as June 19th. The first sets of eggs were found on July 2nd, and the first young lizards were observed on July 31st.

*The specimen recorded by Mr. Patch, which is represented only by a skin, is now in the collection of the Victoria Memorial Museum. He does not state what the colouration in life was.

At Point Pelee, the first egg seen by us was laid by a captive specimen on July 24th, the day we broke camp, so we had no opportunity of searching for nests or eggs in the woods after that date.

Two specimens of blowing adders were found at the marsh. One of these entertained us with a full display of its interesting antics. At first it flattened its head and neck in the usual manner, and hissed and bluffed at striking, but, failing to make the desired impression, it tried the more passive method of turning over on its back and feigning death. Each time it was righted, it again turned over on its back, quite overlooking the fact that a dead snake lies the way it is put, but when we retreated to a little distance, it righted itself and started to glide away.

One of the specimens taken was exceedingly dark in colouration and almost completely lacked any trace of markings on the dorsal region.

Three fox snakes taken were also found at the marsh. One of them, after capture, vomited up a deer mouse and a young cowbird.

The garter snakes at Point Pelee are especially interesting by reason of a strong tendency towards melanism which prevails among them. Patch (1919) refers to it and recalls the capture of three coal black individuals in which the lower jaws and throats were white.

I found only one garter snake answering to this description, but noticed that among many of the more normally coloured specimens there was a marked tendency for dark pigment to predominate, and in one dark olive coloured specimen the light dorsal stripe was almost absent.

We collected, besides the melano, a number of more normally coloured garter snakes and brought them back to Toronto alive, where they were exhibited along with the black specimens at the Canadian National Exhibition. Most of these garter snakes, including the melano, gave birth to young while in the Exhibition cages, but unfortunately all of these litters were indiscriminately mixed together without any attempt having first been made to count them or estimate the percentage of black young among the offspring of each. The black specimen, I understand, gave birth only to black young. The more normally coloured specimens, which vary considerably in the degree of their dark pigmentation, produced many coal black young along with normal ones. Judging from the very large number of black individuals in the total offspring of all these snakes, the melanistic strain must have been very generally present among them.

The black specimen measured about 26 inches in length and appeared to be normal in every way

except in its colour. It was taken at the marsh on July 15th.

On one occasion we observed a garter snake swallowing a young sparrow: the bird in question was brought to our camp on the morning of June 28th by some neighboring children. It was fledged and seemed able to shift for itself, and we let it go. It had only gone a few yards when our attention was drawn by a great commotion among the sparrows in the bushes nearby, where they had gathered in numbers and were chirping and scolding and flying about in the most excited manner. On approaching the scene of all this noisy agitation, we found our young sparrow with its head and neck engulfed in the distended jaws and throat of a garter snake; the snake, which was about two feet in length, took ten minutes to swallow the bird.

From the 15th until about the end of June we found Blanding's turtle quite common, especially along the strip of land bordering the east side of the marsh. After the end of June these turtles gradually ceased their terrestrial wanderings, which were evidently undertaken in search of nesting sites, and we saw comparatively few of them.

On the 22nd of June I saw five Blanding's turtles on the east side of the marsh. One of these which was discovered at about six p.m., was digging a nest in the sand on the top of a knogle under the shelter of some cottonwoods, but my approach had been too sudden and she would not finish the work.

At about 6.30 p.m. on the same day, Mr. L. L. Snyder found two of these turtles digging in the sand high up on the beach, and kept one of them under observation for a while. She dug a hole about 7 inches deep and shaped like a flask, i.e., wider below, with a somewhat narrower neck leading down, and deposited one egg while he watched. He returned to the spot at 10 p.m., accompanied by the writer, and found that eleven eggs had been deposited. The nest had been so carefully covered over with sand and smoothened down, that one would never suspect a hole had been dug there. We took the eggs and set them to incubate in a box of sand which was left exposed to the weather. On the 26th of August an accident happened to them, and one of the members of the party, Mr. N. K. Bigelow, who still remained at the Point, found the young turtles perfectly formed and evidently near to emerging. These eggs had been incubating for 65 days. Snyder (1921) gives a detailed account of this incident.

We found the painted turtle quite common, but the spotted turtle was not so much in evidence, only three specimens being seen. Two of these were seen on June 22nd on the east side of the

marsh. One of them was discovered at about 6 p.m., and was digging a flask-shaped nest with her hind feet in the sandy sod close by the edge of the marsh.

On June 24th and 25th and on July 10th, sets of turtle eggs were found buried at or just below water level in the wet sand at the margin of the largest pond in the marsh, the nests were usually covered over with drift trash washed up by the waves. We did not succeed in hatching any of these eggs, but I feel fairly sure that they were those of the musk turtle. They were obviously not those of any other turtle known to occur at Point Pelee, and in size, shape, texture of shell, and the number of sets, they agreed well enough with Hay's description of the eggs of this species as quoted by Ruthven (1912b), but all of these characteristics taken together would not fit any other species found there.

I recently saw a set of musk turtle eggs taken from the body of a female by Mr. Edward Bensley, of Toronto, and in all the above-mentioned features they closely resemble the eggs which I found in the wet sand at Point Pelee marsh. The choice of such a wet location seems peculiar, as most turtles—even the snappers, which are very aquatic—wander some little way from the water if only a few feet, in search of a drier location in which to deposit their eggs.

Some of the fishermen told me that they sometimes caught soft-shelled turtles in their pound nets, and they spoke of these turtles as living always in the water and only coming out on the

beach to lay their eggs. The turtle in question was evidently *Amyda spinifera* (Le Sueur) as Point Pelee is well within its range. I know of two records from near Hamilton, Ontario, one by Mr. Nash, at Dundas Marsh, and one from Hamilton Bay. It also occurs at Lake St. Clair, and Ruthven (1912c) records it from the southern part of Michigan. However, I have no definite record of any specimen from Point Pelee.

The above lists of nine amphibians and sixteen reptiles include all the records for Point Pelee which I have thus far been able to obtain, but there is no doubt at all that more species could be added to both lists, and any specimens, or records by persons competent to identify their captures would be much appreciated.

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CORALLORRHIZA MACULATA AND ITS VARIETIES IN CANADA.

By HENRY MOUSLEY.



AS I UNDERSTAND this matter to-day, it is as follows.

In *Rhodora*, for August, 1922, there appeared an article by Dr. H. H. Bartlett, entitled, *Colour types of Corallorrhiza maculata* Raf., in which the author describes three colour types of *C. maculata* (Large Coral Root), and further points out that there is every reason to assert confidently that those types are genetical entities, and not mere variations due to environment.

In our latest book on Orchids by Prof. Oakes Ames, *Enumeration of the Orchids of the United States and Canada*, 1924, pp. 21-22, these three varieties appear as var. *flavida* Cockerell, var. *intermedia* Farwell, and var. *punicea* H. H. Bartlett. The substitution of var. *intermedia* for the var. *fusca* of Bartlett in Prof. Oakes Ames's book was brought about no doubt by an article appearing in the February issue of *Rhodora*, for

1923, by Mr. O. A. Farwell, entitled *Corallorrhiza maculata* Raf., in which the author calls attention to the fact that he had already in the *Michigan Academy of Science, 19th Report*, for 1916, page 247, published the brown type as var. *intermedia*, and that therefore Dr. Bartlett's var. *fusca* naturally became a synonym of var. *intermedia*, as dealt with under the heading of synonymy in Prof. Ames's book. Now, owing to my investigations at Hatley, it would appear as if Mr. Farwell had perhaps come to a somewhat hasty decision, in assuming that Dr. Bartlett's var. *fusca* was one and the same thing as his (i.e., Farwell's) var. *intermedia*, for on sending to Dr. Bartlett some colour sketches—from living specimens, by that well-known artist, Mr. Robert Holmes of Toronto—of some forms of *C. maculata* that I had found at Hatley during the past season (1924), I find that there is every reason to believe that var. *fusca* and var. *intermedia* are not one and the same

thing, but two distinct varieties. It is not my intention here to give the exact reasons for the above conclusion, as Dr. Bartlett has dealt fully with the subject in another paper, which will no doubt appear shortly in *Rhodora*, but rather to draw attention to the fact that no intensive work has yet been done—so far as I am aware—with regard to the distribution of these varieties of *C. maculata* in Canada, all the stations so far recorded lying within the United States. It is with pleasure, therefore, that I am able to record the taking of the var. *flavida* Cockerell in a wood a few miles to the north-east of Toronto, by Mr. Robert Holmes. The appearance of the specimen was perpetuated by him in a beautiful water-colour sketch which he made at the time. This form has lemon-yellow flowers with an unspotted (or perhaps spotted, which I look upon as immaterial) white lip; scape and sheaths Martin's-yellow. As regards the forms taken by myself at Hatley, Que., it may safely be said, I think, that I have examples of the var. *intermedia* Farwell, and of the var. *punicea* Bartlett, which latter variety, as its name suggests, is of a lovely pink shade, i.e., the scape and developing fruit are without any trace of brown whatever. The var. *intermedia* Farwell, as I understand it, is a form half-way

between var. *flavida* and var. *punicea*, and, if so, it certainly corresponds with what I take here, and not with the var. *fusca*. Of the latter Dr. Bartlett says, in his forthcoming paper, "After matching carefully the sheath colour of var. *fusca* with vandyke-brown (as represented in Ridgway's *Colour Standards*), I can hardly think that any one having this plant in hand could describe it as exactly intermediate between var. *punicea* ('the species' as Mr. Farwell calls it) and var. *flavida*." If, as Dr. Bartlett says, vandyke-brown is in the "make-up" of var. *fusca*, then I agree with him that the form I take at Hatley cannot be ascribed to his var. *fusca*, but rather to the var. *intermedia* of Farwell.

In conclusion, it is hoped that this paper may be the means of drawing attention to this curious group of saprophytic orchids, and their varieties, as Mr. Robert Holmes tells me that he has found a yellow form of *C. striata*—in a wood about twelve miles west of Toronto—the flowers of which were yellow throughout, with no other colour developed, and with no indication of the striata markings.

I am much indebted to Dr. Bartlett and to Mr. Holmes for the interest they have taken, and the help they have accorded me in various ways.

FIELD STUDIES OF GROWTH FORMS OF SOME OF THE NATIVE TREES OF THE ENVIRONMENT OF VICTORIA, B.C.

By C. C. PEMBERTON,
Victoria, B.C.

IN ASSEMBLING photographic field studies of growth-forms of the native trees in the environment of Victoria, British Columbia, I have met with several phases of tree life about which I have experienced difficulty in gaining information. Some of these are, I believe, undoubtedly exemplifications of known ecological reactions. Others seem to me to be reaction to environmental relations as yet unascertained. I am well aware that as an amateur and living so far away from large libraries, I am not in touch with current literature and am not cognizant of the most recent researches and findings.

I therefore seek to publish these field studies and notes in the hope of eliciting information and possibly of enlisting the interest of others.

FASCIATION OF THE PLAGIOTROPOUS SHOOTS OF FIR CONSEQUENT ON THEIR CONVERSION TO ORTHOTROPOUS SHOOTS. ALSO SIMILAR FASCIATION OF THE ORTHOTROPOUS SHOOT OF FIR WHEN OVERTURNED OR EVEN WHEN DIVERTED FROM THE VERTICAL DIRECTION OF GROWTH.

The dominant apogeotropism of the primary axis or orthotropic shoot in conifers of the fir type is most obvious; it is also a well known ecological reaction. The diageotropism and dorsiventral symmetry of the radiating lateral branches or secondary plagiotropic shoots of the fir are also most obvious and commonly known characteristics.

A familiar instance of correlation of organs in plant life is when the primary orthotropic shoot is lost or suppressed and one (or more) of the lateral branches or secondary (plagiotropic) shoots promptly assumes the vertical orthotropic lead in lieu of the lost or suppressed primary leader. A similar correlation, not perhaps so frequently met with, occurs where the primary axis becomes diverted or overturned from the strict vertical growth. Its terminal leader then seeks to re-establish the vertical lead and any branches which become placed in vertical position by the diversion of overturning speedily change from dorsiventral to radial symmetry and become typically orthotropic. The branch nearest the base, however, generally becomes the dominant shoot at the cost of the more remote branches and former



FIGURE 3.—COMPARISON OF GROWTH FORM BETWEEN CONIFERS OF FIR TYPE AND BROADLEAF TREES (ANGIOSPERMS).

Normal growth-form of Grand fir (*Abies grandis* Lindley) left, and Douglas fir, (*Pseudotsuga taxifolia*, [Poir.] Britt.) right, viz: single vertical primary axis from which lateral branches radiate in dorsi-ventral symmetry. Normal growth-form of Garry oak, (*Quercus Garryana* Hooker) centre, viz: initial single vertical primary axis followed by continual bifurcation in which the identity of the initial axis is lost.

leader, which soon die off.

On loss of the leader a young lateral branch, being pliant, can bend upward so completely that soon the point of bending can not be detected. Older branches, lower down, can not bend and it is therefore only their terminal buds which react to gravity and become vertical. Curious fasciation ensues in the girth increment of the older part of these branches. Co-incident with the upturning of the tip of the branch, super-development of fasciated and looped annual rings appears on the lower side of the older and more horizontal part of the branch and there is of necessity continuity in girth increment between the lower side of the branch and the stem of the primary axis of the fir. In the case of diverted or overturned primary axes similar fasciation in girth increment follows in the stem compelled to grow out of strict vertical direction.

Examples of the fasciation of substitute branch-stems and of the diverted primary axes abound in the vicinity of Victoria and every stage and phase of the phenomenon can be readily observed and it would seem that by means of this fasciation stems of conifers of the fir growth form could be made to assume almost any shape desired.

I have not found any reference to this fasciation in any text book, though the substitute leaders

and overturned axes must have been under observation of foresters, lumbermen and botanists continually. In Sachs, *Lectures on the Physiology of Plants* (The Clarendon Press, MDCCCLXXXII, page 505), reference is made to fasciation of substitute leaders of Scarlet Runner, as follows:—

"If, for example, the Common Scarlet Runner (*Phaseolus multiflorus*) is allowed to germinate till the primary root is about 10-12 cm. long, and the young germinal shoot between the two cotyledons, the so-called plumule, is then carefully cut off, then, as the root-system increases in strength

and activity, vigorous shoots grow out from the axils of the two cotyledons. These shoots do not usually develop in this plant, because as a rule the normal primary shoot attracts to itself the whole of the supply of nutriment from the seed, so far as it is suited for the formation of leaf-shoots. In our experiment, on the contrary, the shoot-forming substances of the seed penetrate into the growing-points in the axils of the cotyledons and cause them to sprout vigorously. Not rarely, however, an abnormality makes its appearance here; these vigorously growing axillary shoots of the cotyledon exhibit so-called fasciations, i.e., the shoot-axes become broad and band-like, and crooked, and still other abnormalities occur. Since fasciations not rarely occur in plants of the most different kinds—e.g., in Willows, in Compositæ of the Camomile group, etc.—it is at any rate of some interest to know that it is also possible to produce such abnormalities artificially."

In *History of the Lumber Industry of America*, by James Elliott Defebaugh, Vol. 2, p. 493 (The American Lumberman, Chicago, 1907), the mining of buried cedar logs, "*Cupressus thyoides*," in the Dennisville swamp, New Jersey, as described in Franklin B. Hough's Report upon Forestry, 1877, is quoted. The following extract from the quotation seems to bear on the subject of fasciation of overturned primary axes, viz:

"Tree after tree, from 200 to 1,000 years old, may be found lying crossed one under the other, some partly decayed, as if they had died and remained standing a long time and then been

broken down. Others had been blown down, and some had continued to grow for a long time after falling, as known by the heart being much above the centre, and by the wood of the under side being hard and boxy."

The works mentioned in the foot note, No. 6, viz: "George H. Cook's *Geology of New Jersey* (1868), *Scheyichbi and the Strand*, by Edward S. Wheeler (1876), and Lyell's *Second Visit to the United States*, are not available here.

I have observed that some of the garden species of *Cypressus* normally show fasciation of the horizontal portion of the lower branches, the terminals of which have become orthotropic naturally and according to the growth form of the species. I think, too, that the large lower limbs of *Cedrus* (*Cedrus Libani*, etc.) often show fasciation. The illustrations which I have seen of large ancient specimens of the California Big Tree (*Sequoia Washingtoniana* [Winsl.] Sudworth)—(*Wellingtonia*)—appear to me to denote that some of the plagiotropic shoots of these old trees are prone to develop terminal substitute orthotropic shoots with consequent fasciation of the horizontal part of the branch. I have not had opportunity of seeing the trees themselves. On the other hand, so far as I have observed, the broadleaf type (Angiosperms) do not, when naturally or accidentally prostrated, ipso facto, show fasciation.

I have supposed that this fasciation is a positive geotropic reaction due to the impeding of the descending elaborated sap.

I venture to surmise that the plagiotropic shoot of the fir type, inasmuch as it has adapted itself to dorsi-ventrality of symmetry, may also normally adapt its girth increment to radial configuration but that on change to orthotropic reaction the fasciation may be, so to speak, a co-relative abnormality. I, however, put forward these surmises with all diffidence.

FIGURE NO. 3.
—Illustrates the

difference in normal growth-form between the conifer of the fir type and that of the broadleaf trees generally. The fir type (Grand fir, left, and Douglas fir, right) has the single vertical primary shoot from which radiate the lateral branches with their bi-lateral branchlets in dorsi-ventral symmetry, tapering from the lowest tier toward the apex of the primary stem and giving the tree the pyramidal form known as the "Christmas Tree". In the broadleaf type, (centre, Garry oak, *Quercus Garryana* Hooker), continual bifurcation soon commences and the identity of the primary axis is speedily lost in proliferation of limbs and branches. The illustration shows invasion of the original natural meadow lands of the vicinity of Victoria by mixed formation of conifers and broadleaf trees.

FIGURE NO. 4.—Illustrates the difference in the matter of girth increment between the fir type and broadleaf type and also gives an example of fasciation of the stem of a prostrated primary axis of fir. Centre (Broadleaf maple, *Acer macrophyllum* Pursh): The continuity of ring of annual increment between the original stem and each of the limbs is apparent. In the loop between the limbs however, there is often diversity of cross grain, graftage, etc. Right, the top of a stump of Douglas fir, the centre of which has decayed but the cut on the top has been healed over by root

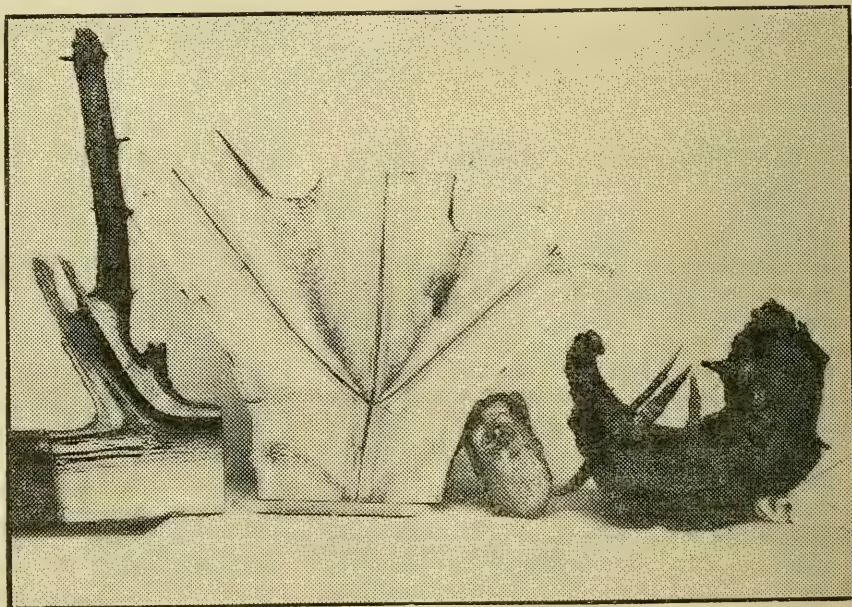


FIGURE 4.—FASCIATION IN SUBSTITUTE BRANCH LEADER AND IN PROSTRATED PRIMARY AXIS OF FIRS.

Right: portion of trunk of Douglas fir (*Pseudotsuga taxifolia*, [Poir.] Britt.), showing differentiation in rings of girth-increment between primary and secondary axes or orthotropous and plagiotropous shoots: centre: section of trunk of Broadleaf maple, (*Acer macrophyllum* Pursh.), showing continuity of ring of girth increment of primary stem with that of each of the limbs. Left: Grand fir (*Abies grandis* Lindley), showing fasciation due to prostration of primary axis; third specimen from left: fasciation of prostrated fir stem in cross section.



FIGURE 5.—FASCIATION IN SUBSTITUTE BRANCH-LEADER AND IN PROSTRATED PRIMARY AXIS OF FIRS.

Initiation of the substitution of a lateral branch for the primary axis in the matter of vertical lead. The primary stem has been destroyed and one of the lateral branches below the point of injury has become vertical in lieu of the lost leader. Douglas fir (*Pseudotsuga taxifolia*, [Poir.] Britt.). Locality, Victoria, B.C.

graft. The remains of the dead branches show how the rings of annual girth increment of the stem had encroached on those of the lateral branches. The specimen on the left and the second specimen from the right show the fasciation of a prostrated Grand fir stem.

FIGURE NO. 5.—Gives an illustration of the initiation of the up-turning of a lateral branch of Douglas fir in order to resume the vertical lead of the primary leader, which had been destroyed at this point.

FIGURE NO. 6.—Apparently the Douglas fir in this illustration had its leader broken off in early life. The bent portion (about the centre of the picture) seems to indicate that the leader had been lost at that point and a young lateral branch had so completely resumed the lead that it looks like a continuation of the original stem. Lower down other lateral branches had made an effort to change from the secondary diageotropism of the lateral branch with dorsi-ventrality of symmetry to the apogeotropism of a primary axis with radial symmetry. On the right apparently an adventitious shoot had also developed and had later been killed by shade of the surrounding firs, since felled and piled as cordwood.

FIGURE NO. 7.—This picture shows, in section,

the fasciation of the older portions of substitute branch leaders of conifers. Left is a cross section of a partly substitute branch leader such as the lower vertical shoots in Figure No. 6, and on the right is a cross section of the more horizontal part of these branch-substitutes. There is great diversity in the shapes assumed by the fasciated branch-leaders. The development on the lower side of the branch-leader may be in pear-shaped, oblong or oval. These specimens were lying on a log of oak when photographed.

FIGURE NO. 8.—This shows a longitudinal section made of an original stem of a fir together with one of the substitute branch-leaders such as those in Figure No. 6. The illustration proves that before substitution the girth increment of the stem enveloped that of the lateral branch and after substitution there was continuity in ring of girth increment between the fasciated lower side of the substitute branch-leader and the stem of the primary axis below the point of substitution.

FIGURE NO. 9.—The specimens "C2" on the extreme right and "C1" second on the left show the way the rings of girth increment of the primary axes of firs envelope those of the lateral branches. In "C2" the rings of girth increment of the lateral branch are seen to lie athwart those of the primary

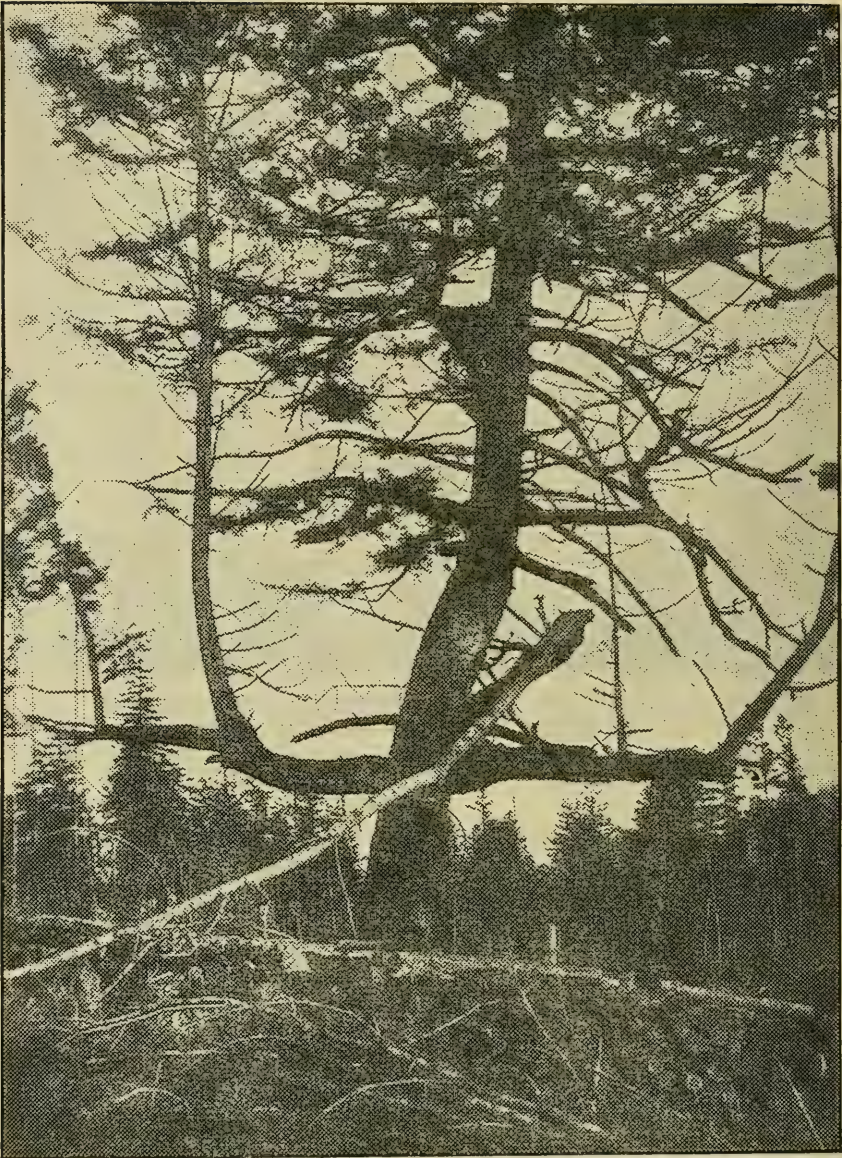


FIGURE 6.—FASCIATION IN SUBSTITUTE BRANCH-LEADER AND IN PROSTRATED PRIMARY AXES OF FIRS.

Substitution of several lateral branches for a lost primary leader. Note the fasciation of the horizontal position of the lower substitute branch-leaders. Douglas fir (*Pseudotsuga taxifolia* [Poir.] Britt.). Locality, Victoria, B.C.

axis and in "C1" the hole left by a dead branch which had fallen out is portrayed. The specimen "B" on the left is an adventitious shoot sprung from the cut on a stump of a broadleaf tree (Dwarf maple, *Acer glabrum* Torrey). The second specimen from the right is an adventitious shoot developed on the prostrated shoot of a young Grand fir. Fasciation of the prostrated stem has just commenced. The centre specimens are sections of a healed-over stump of Grand fir from

which adventitious shoots had developed below the cut and thrived until killed by shade. This stump proved to be root-grafted to a foliage possessing tree of the same species near by. The capping might therefore be one of those cases of overgrown stumps caused by root graft. In all my experience of overgrowth of stumps the wood of the original stump is dead and the capping starts with the cambium on the stump at the time of felling. In this instance some of the outer rings

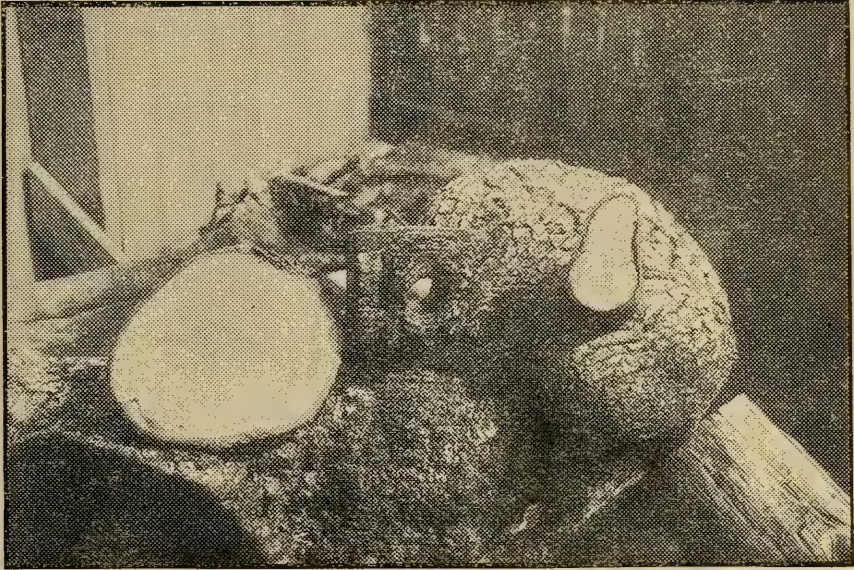


FIGURE 7.—FASCIATION IN SUBSTITUTE BRANCH-LEADER AND IN PROSTRATED PRIMARY AXIS OF FIRS.

Left cross-section of a substitute branch-leader where several of the branches have become equally nearly vertical in direction of growth. Right cross section of horizontal portion of substitute branch-leader. See Fig. No. 9.

of the stump had remained vital as can be seen in the illustration. The capping, therefore, was likely to have been formed in the first instance by the sprouts. At the time the specimen was secured the sprouts were dead, but the capping was vital. The retention of vitality in the stump must have been due to the root graft but such vitality did not extend to any part of the sprouts! The sprouts had sprung from below the cut of the stump and were probably there at the time of felling. Lateral adventitious shoots often develop on the stems of Grand fir. They are necessarily plagiotropic initially and are then dorsi-ventral in symmetry but they often become orthotropous as they grow older and at the same time change to radial symmetry.

TROPISMS OF THE GARRY OAK (*Quercus Garryana* Hooker).

The Garry oak is the sole species of oak native to the Province of British Columbia and it occurs only on the southern portion of Vancouver Island and some of the adjacent small islands. It is very plentiful close to Victoria where it forms an outstanding feature of the landscape. Its maximum size so far north has been commented on as not at all like a species nearing the limit of its range.

When the tree grows in upland and rockland environment, its stem and limbs assume very fantastic shapes with multitudinous contortions,

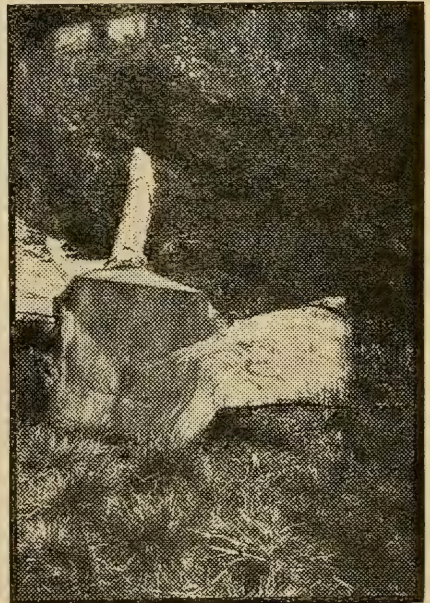


FIGURE 8.—FASCIATION IN SUBSTITUTE BRANCH-LEADER AND IN PROSTRATED PRIMARY AXIS OF FIRS.

Longitudinal section of stem and substitute branch-leader showing the stem of the original lateral branch penetrating into the centre of the primary stem; also, showing the excessive formation of rings of wood on the lower side of the branch following its substitution. Note the continuity of ring of the substitute branch-leader with that of the primary axis. Grand fir (*Abies grandis* Lindley).

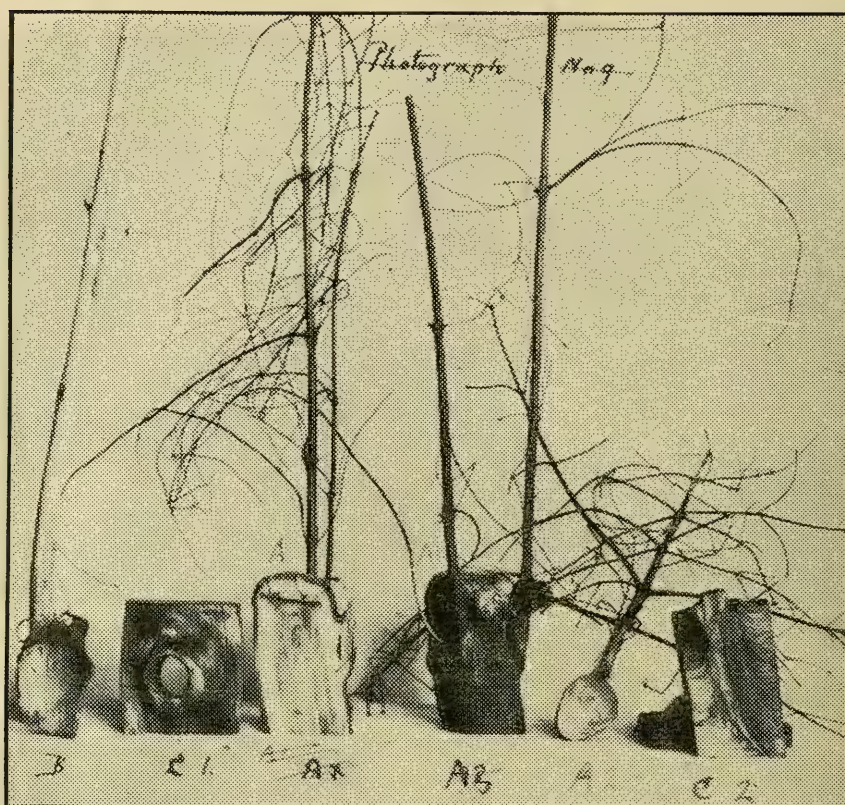


FIGURE 9.—ADVENTITIOUS SHOOTS, PRIMARY AND SECONDARY AXES, ETC.

Left "B": adventitious shoot from cut stump of broad-leaf tree (*Acer glabrum* Torrey). Left "C1": hole left in trunk by dead lateral branch of Douglas fir (*Pseudotsuga taxifolia* [Poir.] Britt. . Centre: capped stump of Grand fir (*Abies grandis* Lindley), showing adventitious shoots. Right: lateral branch of Douglas fir enveloped by wood of the main stem. Second specimen from right: adventitious shoot developed on prostrated primary axis of Grand fir. Note the fasciation attendant on prostration just commencing on the lower side.

twistings and turnings. In the lowlands the shapes are more normal.

GIRTH INCREMENT

A curious feature in the girth increment of the oak is a tendency for the wood of the stem and branches to form protuberances toward, adhere to, and spread over any rocks that are near the tree.

The spread often is in a pancake shape which can take place at the base of the stem or anywhere higher up on the stem or limbs. Protuberances in the wood also often stretch from the stem or limbs toward nearby rock, to which they become firmly attached. Not all the oaks which may be in apparently similar positions with reference to rock show the characteristic and the stem or limbs of any one tree may have more than one of the protuberances. Figure No. 10 shows a case of the pancake-like spread of the wood at the base of an oak over an adjacent boulder. It is apparent that the spread is irregular, being greater in one

direction than another, and being upward as well as downward. It is also evident that by the increase in girth the centre of the tree has become poised over the boulder, Figure No. 11 illustrates the case of limb-like protuberance which has grown in this case downward and become attached to a boulder of rock on which it forms a sort of socket which holds the tree to the boulder.

No explanation is forthcoming, as far as I can learn, for phenomena of this kind. Healing of a wound, tropic reaction to electricity, or to some unascertained property in particular portions of the rock have been suggested. Other species of trees in this vicinity do not show the characteristic so far as I have observed (except, perhaps, in the case of one arbutus). The phenomenon of spread of wood over extraneous objects seems recently to have attracted attention in England. In *A Text-Book of Wood*, Herbert Stone, (London, William Rider & Son, Limited, 8 Paternoster Row, E.C., 1921, p. 190), the author says:—



FIGURE 10.—TROPISMS OF GARRY OAK.

Typical spread of wood of girth increment over rock masses at the base or in touch with the stem or branches of the tree. Locality, Victoria, B.C.

"Birch and other trees when strangled by Honeysuckle form cushions which roll over the stem of the climber (chiefly on the upper side) and eventually bury it. It is well known that wires fastened round trees will become imbedded in the wood in the same way as the stem of the Honeysuckle; moreover, if a wire merely touches the tree without actually passing round it (as may happen when it is close up to a wire-fence), the callus will grow along the wire and form snout-like prolongations, which may be as much as five inches in length. The roots of an Elm-tree grow-

ing in the Birmingham Botanical Gardens in a very light soil, produced outgrowths which enveloped any pebble with which they came in contact. This covering in some cases is so complete that the pebbles with their integument of root resemble potatoes. Mr. H. A. Cox tells me of a "Tree of Heaven" (*Ailanthus glandulosus*) at Fulborne which has produced a large mass of callus on the top of a wall. After passing across the whole width of the wall (9 inches) the callus has commenced to flow, as it were, down the other side."

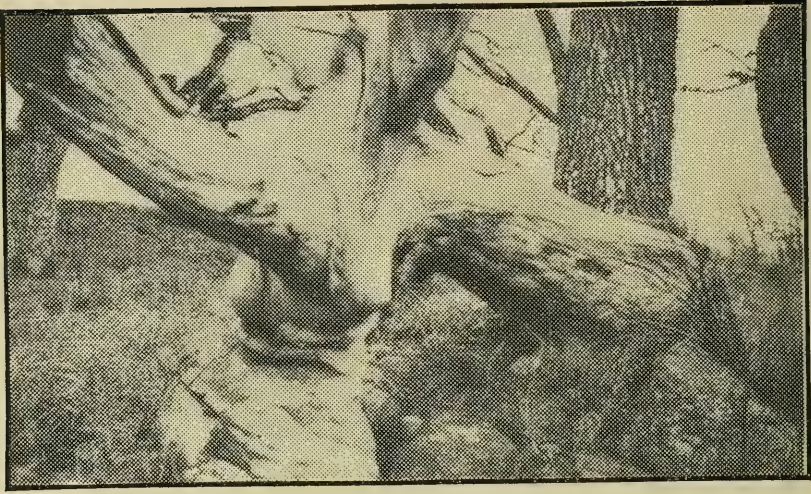


FIGURE 11.—TROPISMS OF GARRY OAK.

Curious characteristic of Garry Oak (*Quercus Garryana* Hooker), Swellings and protuberances develop in the girth increment and attach themselves firmly to adjacent rock masses. Locality, Victoria, B.C.

I have never seen prolongations of wood along the wires of fences, like those described by Mr. Stone. In the Mineral Museum of the Parliament Buildings, Victoria, B.C., there is a specimen of a large piece of rock nearly covered with a coating of the wood and bark of a coniferous tree. The specimen has lain in the Museum for many years and is said to be from Kamloops district, B.C., and to have been found at the base of a large Western Yellow Pine (*Pinus ponderosa* Dougl.). The name of the finder of this specimen and the particulars of the finding are lacking. I have asked foresters and others of the Dry Belt of Kamloops district whether they have seen any other instances of the overgrowth by wood of stone, or rock. They all assure me that they have never seen any such occurrence.

The question of possible tropisms incident to vegetative activity of girth increment does not seem to have received much consideration. In the exogenous tree of the temperate zone the girth increment is radial in cylinders or annual rings which increase during the period of vegetative activity, by degrees, as the sap travels downward from the foliage to the root tips. In the fir type, apparently, the girth increment of the secondary and primary axes comes from different directions and when the branch loses its foliage the stem will not, so far as I can learn, supply food to keep the branch alive. In the fir type no callus nor healing from the reserve material takes place on the stump of a felled tree, nor at the base of a felled stem. By means of root graft, however, healings of stumps of fir trees can take place at great distances from the host tree and the forma-

tion of the wood occurs horizontally along the intergrafted roots and upward into cappings on the stumps as well as downward to their roots. The sap can apparently also be passed on by one stump to another by secondary root graft and the callus can also pass down into the cavity of a hollow root-grafted stump, and also heal over the broken end of a root of another tree with which the roots of the host tree may have formed a graft. With all this power of transmitting wood forming material, I have never seen any conifer in this district show the slightest tendency to envelope any rock or other surrounding materials such as rock, wire, etc.

In the broadleaf type of tree, the healing of wounds on the stem is preferably from the top downward and from the sides inward. Cappings of lateral or vertical limbs which have been broken or pruned can also take place and this healing generally is in a ring toward the centre and outward or upward, as the case may require. Felled stems of broadleaf trees can also form a limited amount of callus at the lower end of the cut stem and the power possessed by broadleaf trees of forming callus on stumps from the reserve material is generally known.

The growth of the girth increment of the stems of the oaks both in the pancake spread, such as that shown in Figure No. 10, and the limb-like protuberance of the type illustrated in Figure No. 11 are to my mind quite different to vegetative activity of a healing. I believe they will prove to be tropic reaction to some unascertained stimuli in the rockmasses close to the tree.

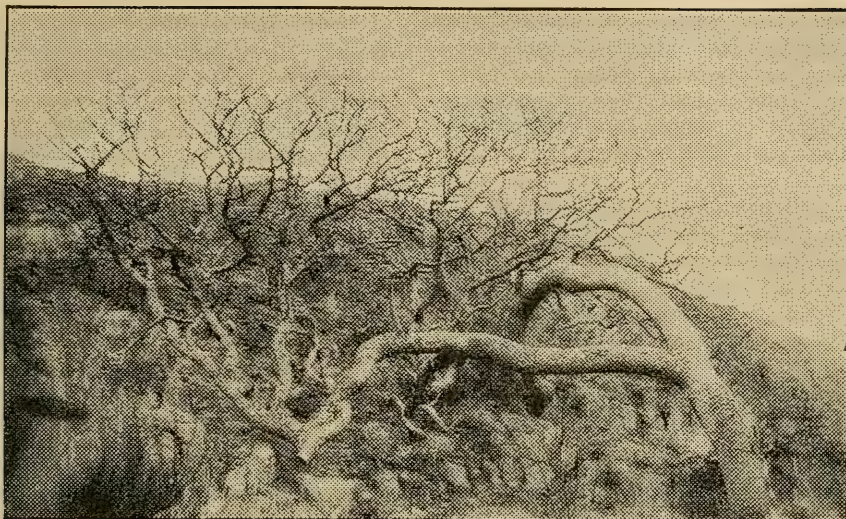


FIGURE 12.—TROPISMS OF GARRY OAKS.

Characteristic apical elongation of terminal buds toward rock masses in the neighbourhood of the tree. After attainment of the apparent objective the normal growth-form is resumed. Locality, Victoria, B.C.

APICAL ELONGATION

Rock in the environment of oak seems often to influence the direction of growth taken by the trees. There are many cases where an oak or one of its limbs bends over toward nearby rock and after attaining a certain point resumes more vertical growth. Frequently, the stems are quite procumbent for a while and these bendings are not

in the direction of prevailing winds, etc. Figure No. 12 gives an illustration of one of the many phases of the characteristic. It shows a pronounced bending over of the stem and limbs of an oak till certain points in the rock close at hand have been reached. Then the branches curve sharply upward and assume the normal growth-form of the oak.

FURTHER OBSERVATIONS ON CANADIAN EUPHYLLOPODA

By FRITS JOHANSEN

EUBRANCHIPUS GELIDUS

THE TEMPERATURES around Ottawa for the first half of April, 1924, were between 26°F. and 48°F., except for the minimum of 14°F. on March 31-April 1st., and the maximum of 52°F. on April 4th. The weather was mostly clear, except for snow on April 25th; rain on the 6th, 9th and 13th, and some overcast days.

On April 13th, I looked for Phyllopoets (*E. gelidus*) in all the pools and ponds between Fairy Lake and Wrightville (Hull), Que., where I found them last year; but I could discover no hatched larvae, though the pools were ice-free, and the snow had almost disappeared from the fields here. Air temperature at 4.15 p.m. 38½°F., of water in pools 44°F.; overcast, rainy and windy.

On April 16-17th, the temperatures were between 28°F. and 54°F., and the weather clear. During these two days most of the hibernating

eggs of *E. gelidus* hatched in the ponds around Ottawa.

April 18-19th were rainy (particularly the 18th) and colder (38°-42°F.), thus delaying the hatching of further eggs; but the next two days, though cloudy, had a higher maximum-temperature (52°-54°F.), and a minimum-temperature of 32°F., thus facilitating the hatching of more eggs of *E. gelidus*.

On April 29th, I went to the pools on the fields at Billings Bridge, Ont. The overflow from the Rideau River on the fields had now subsided, and the pools had become ice-free and mostly isolated. Many of them contained young *E. gelidus*, ranging in length from 4 to 12 mm., and in the largest ones the two sexes could already be differentiated, though apparently less than a week old. I also secured here half a dozen larvae of *Limnetis gouldii* (see below). Temperature of air 48°F., of water in the pools 56°F. (4.30 p.m.; overcast).

Next day I went again to the different pools between Fairy Lake and Wrightville, Que., and in most of them, which usually contain *E. gelidus*, I found many young of this fairy-shrimp, 4-10 mm. long, thus about four days old. Temperature of water in these pools 57°F. at 4 p.m. (Air 50°F.; overcast).

In the small pond further west and close to Fairy Lake (between the "Mountain-road" and the Lake) I found on the same day millions of only 1-2 days old larvae of *E. gelidus*, all in the metanauplius stage (for a description and figure of this stage see *Canadian Field-Naturalist* for January, 1924), and 3-4 mm. long. They had probably hatched only the day before, because this particular pond became free of ice and snow later than the others. From these observations it will be seen that even around Ottawa, the hibernating eggs of *E. gelidus* do not hatch simultaneously in the different pools and ponds, where the species occurs; but it depends upon what time each one becomes free of snow and ice. First hatch the eggs in the pools formed by the overflow of Rideau River; next the eggs in the ponds on the grassy fields, e.g., at Wrightville; while in the small ponds situated in pockets upon hill-slopes they hatch still later.

During April 20-25th the temperatures were between 32° and 56° F., with mostly overcast weather, except for rain on the 22nd, and the 20th clear.

On April 27th, I again went to Billings Bridge, and the fairy-shrimps now had a length of 10-15 mm., the largest ones of both sexes being mature, the females containing ripe eggs, and the males with large claspers (2nd pair of antennae). *Limnetis gouldii* in the metanauplius-stage were also secured (see below).

The temperatures during April 26-30th, were between 38°F. and 74°F., and the weather clear, except rain on the 30th. On May 1-10th, the temperatures were between 36°F. and 60°F., with overcast weather, except for rain on the 3rd, 4th, and 10th, and the 6th clear.

On May 11th, I again went to the pools outside Wrightville. In the pools (see April 27th) on the north-side of Fairy Lake, the fairy-shrimps now had a length of about 10 mm., and both sexes mature, except for a few delayed individuals, about 7 mm. long. In the other pools nearer Wrightville, they were full-grown (15-20 mm. long) and both sexes mature, (eggs and claspers). The weather was overcast, clear and sultry.

The temperatures on May 12-21st, were between 30°F. and 68°F., but only on May 18-20th was the minimum less than 40°F. May 12-14th were overcast, with rain on May 15th and 18th; the other days clear.

On May 22nd, I went to Billings Bridge, and found many adult fairy-shrimps of both sexes in the different ponds on the fields here. In some of the pools they were smaller (15 mm. long) than in others (20 mm. long), probably owing to the difference in amount of food available in the ponds. Weather clear and warm, with an air and water temperature of about 60°F. at 4.30 p.m. Later in the day I placed some live *E. gelidus* (females with eggs) in the rock-pond at the quarry between Billings Bridge and Hogsback, to see if they will thrive here, where they have never been observed so far. This pond has a muddy bottom and rich aquatic vegetation, and if the other localities where they occur around Ottawa should be destroyed (filled in) in the future, the quarry pond may remain.

On May 25th, I examined a couple of smaller temporary pools alongside the railway and car-tracks near Tetreauville (Hull), Que. The largest ones of them was 1-2 feet deep, and its bottom is formed by the gravel used for the tracks, covered with a great mass of filamentous algae on pieces of wood, etc. I observed a number of adult (2 cm. long), female *E. gelidus* with ripe eggs swimming around here (half a dozen kept), but only a few males of the same species. A similar, but still smaller pool, next to it, probably also contained these fairy-shrimps earlier in the spring, but had now dried up. This is a new locality for *E. gelidus*, around Ottawa.

The temperatures on May 22nd to 31st were between 36°F. and 70°F., with clear weather except for May 23-27th, when it was overcast-rainy, and hail-showers on May 25th.

On May 29th I again went to Billings Bridge. Though the small pools had dried up or almost so, the others still contained living *E. gelidus* of both sexes, though males were few. Particularly was this noticed in one of the larger ponds, which contained a great many fairy-shrimps; but among the hundreds of females (with ripe eggs) there were only half a dozen males. This is the same pool in which *Limnetis gouldii* (see under this species) was noticed a week ago to be considerably larger than in the others, as was also the case to-day. Temperature of water about 60°F., of air 58°F., at 5 p.m.; clear. More live *E. gelidus* were transplanted to Brulé's quarry-pond at Hogsback to-day.

While two (27th and 30th) of the last days of May were cooler (maximum temperature 56°F.), the five first days of June had temperatures between 42°F. and 72°F., the maximum temperature being 70°-72°F. on all five days (all warm and mostly clear).

On June 5th I again went to Billings Bridge, but in spite of careful search I was unable to find a

single *E. gelidus* to-day, even in the pond where they were so numerous a week ago. Nor were there any to be seen in the quarry-pond near Hogsback. The very last days of May thus represent the latest occurrence of *E. gelidus* around Ottawa, in 1924, which is 3-4 days later than in the preceding year (see *Canadian Field-Naturalist* for January, 1924). This is probably owing to the comparatively late (middle of April) hatching of the eggs in 1924, around Ottawa; and the cool weather during the spring this year, which made the season for this fairy-shrimp a little longer than in other years.

LIMNETIS GOULDII (*L. brachyurus*).

The finding, on April 20th, of the first larvae of this clam-shrimp in a pool on the fields at Billings Bridge, together with young fairy-shrimps, has been mentioned above, under *E. gelidus*. I secured six nauplii, $\frac{1}{2}$ mm. long, of the clam-shrimp, all with the appearance typical for this species ("turtle-shell", etc.; see *Canadian Field-Naturalist* for January, 1923). The four of these nauplii moulted and transformed into metanauplii (double "clam shell", etc.) before preservation the same evening. The (hibernating) eggs of *L. gouldii* thus began hatching to-day, a week earlier than last year, while most of the eggs of *E. gelidus* hatched in 1924 three or four days earlier than in 1923.

A week later (April 27th) I secured at Billings Bridge a number of metanauplii of *L. gouldii*, in the same pools, by using a pipette and standing out in the water. They were between $\frac{1}{4}$ and $\frac{1}{2}$ mm. in diameter, the smallest ones having apparently just transformed from the nauplius-stage. Temperature of air and water in the pools was about 60°F. at 4 p.m. (Clear).

On April 26th, and 27th, the maximum temperature went above 60°F., and they were the first real warm days this spring, thus speeding up the hatching of the eggs of *L. gouldii*.

I again examined the pools at Billings Bridge for clam-shrimps on May 22. The smaller pools had now almost dried up; but even these contained *L. gouldii*, which were present in all the pools in millions and had a size of about 2 mm. in diameter, except in one pool, where they were larger (3-4 mm.), though not yet with eggs.

A week later (May 29), *L. gouldii* was still present in these ponds in millions, even in the almost dried-up pools. They were from 2 to 4 mm. in diameter, the largest ones being found in one of the largest pools (see May 22). Both sexes were present and seen in copulation; the females carried eggs. I noticed that some of the smallest individuals were females, some of the largest ones

males, so there is apparently no difference in size between the two sexes, in this species.

On June 5th, all the small pools in the fields at Billings Bridge had dried up; but the others all contained great quantities of *L. gouldii*, with a size of from $2\frac{1}{2}$ to $4\frac{1}{2}$ mm. in the one pond (see May 29), and less than 3 mm. in the other ponds. I collected a number of them, and later in the day transplanted them alive to the pond at Brulé's quarry near Hogsback, to see if they will thrive here, where they have so far not been observed. Weather clear and warm.

On June 15th, I visited the pond at Tenaga, Que. (see *Canadian Field-Naturalist* for January, 1924), and found that it still contained a few *L. gouldii*, though they were not nearly so numerous as earlier in the month. I secured only eight specimens in all, half of which were females with eggs, half of them males; and these represented both large and small specimens of the two sexes. The weather was sultry, with weak sun. No *E. gelidus* were seen.

Six days later I again went to the pools at Billings Bridge. Only the two largest ponds contained any water now; but there were still quite a few *L. gouldii* in them. The clam-shrimps had a size of from $2\frac{1}{2}$ to 4 mm., and were mostly of a brownish colour, only a few orange-colored. The females carried eggs, and the two sexes were often seen in copulation.

The weather during June and the first week of July, 1924, was warm, with temperatures between 42° and 88°F.; mostly clear, with rainshowers of short duration on June 2, 6, 12, 13, 14, 26, 28 and July 3rd.

Finally, on July 6th, I paid the last visit to the pools at Billings Bridge. They had now all dried up, except the largest pond, the deeper parts of which still had pools of water. By wading out into these and standing here, I secured, by stirring up the water, in the course of half an hour, two dozen *L. gouldii*. Both sexes were represented, and copulating freely; except a couple orange colored ones they all had a brownish coloration. I kept them alive, and the last two of these died four days later.

This is ten days later than *L. gouldii* was observed around Ottawa in 1923, and the latest record of them from this vicinity so far.

The different, outward conditions causing the disappearance of *E. gelidus* and *L. gouldii* in the summer, around Ottawa, is thus both striking and interesting. In the case of the fairy-shrimp it is the advent of summer-weather, which makes it disappear suddenly in the middle or end of May, though there is still plenty of water and food in the pools in which they occur. The clam-shrimp, however, apparently does not disappear entirel

until all the pools in which it occurs have dried up completely; and the observation given above, under July 6, 1924, shows that they are very tenacious to life and able to thrive, even if only a square foot of water or two remains of the pool or pond in which they are found. The observation also shows that at least in certain years (e.g. 1924) the season around Ottawa for *L. gouldii* is as long as two and a half months, from the time the (hibernating) eggs hatch in the spring, to the dying off of the last adults in July.

It would be interesting to know more about the life-history of this clam-shrimp on the prairies of

western Canada, where it seems to be found (at least in certain ponds) even in August, judging from a Saskatchewan record (see *Canadian Field-Naturalist* for May, 1921). In Eastern Canada there is only one record (see above, July 6, 1924), of it, later than June; but it has been recorded (A. S. Pearse, in *Occas. Pap. Mus. Zool., Univ. of Mich.* No. 1, December 20th, 1913), as abundant on July 4th, 1912, in a pond in Massachusetts, and in the northwestern part of this continent it has also been collected in July (see *Canadian Field-Naturalist* for May, 1921, post-script).

INTEGUMENT OF CHASMOSAURUS BELLI*

By C. M. STERNBERG



IN THE early days of Palæontology there was little expectation of securing complete skeletons of extinct animals and much less of ever gaining an adequate idea of the integument of land-dwelling forms. Since then our knowledge of the dinosaurs has advanced to such a stage that to-day we not only know every bone of the skeleton of many of the forms but have a fairly accurate idea of the musculature and the external covering of the body. Even the eggs of one form have been found.

The integument of the *Hadrosauridæ* has been known for a number of years from field observation and small specimens of the impression in some museums; but it was left for my father, C. H. Sternberg, to collect the first skeleton of a dinosaur in which the impression of the greater part of the external covering is preserved. I refer to the skeleton of *Thespesius annectens* (*Trachodon annectens*), which was collected from the lance formation of Niobrara County, Wyoming, and is now in the American Museum of Natural History, New York, known as the Mummy dinosaur. Since that time several specimens of hadrosaurs have been collected from the Upper Cretaceous strata, in which more or less of the integument is preserved as impressions on the sand or clay, so that to-day there is practically no part of the body of which the integument is unknown.

In the case of members of the other families of dinosaurs much less is known of their external covering. For years it was thought that the horned dinosaurs had been covered with dermal scutes or bony plates in the epidermis because dermal scutes were found in more or less close association with the bones of horned dinosaurs. We now know that these dermal scutes are from the armored dinosaurs and there is no evidence of

the presence of such scutes in the *Ceratopsia*.

The integument of a horned dinosaur was first described by L. M. Lambe, F.R.S.C., in the *Ottawa Naturalist* for January, 1914, from a specimen of *Chasmosaurus* (*Protorosaurus*) *belli* collected by C. H. Sternberg in 1913 from the Belly River formation of Red Deer river, Alberta. At that time Mr. Lambe had only fragments of the rock bearing the impressions, as the large section showing the pattern over a considerable area was not prepared until after his death.

The object of the present article is to describe more fully and illustrate the pattern or arrangement of the large, round plate-like and the smaller polygonal tubercle-like scales rather than go into a detailed description of the scales themselves, which were so admirably described by Mr. Lambe. The integument here described is from the same individual as were Lambe's fragments, Cat. No. 2245, Victoria Memorial Museum, and consists of a section about 1½ feet by 3 feet, from above the pelvic arch and the right flank. The median line is not recognizable, though it is thought to have been not far beyond the part preserved. Due to the fragility of the rock bearing the impressions and the necessity of removing the underlying bones, it was possible to save only parts of the impressions. Before they were disturbed, however, a photograph and plaster mould were taken of those parts best preserved.

As in the hadrosaurs there is no evidence of bony plates in the skin but the tubercles were much larger and somewhat thicker than in that family, although the animal was smaller. There is great variation in the size of the tubercles and even over a small area there seems to be no uniformity though the tubercles on the upper part of the body seem to be much larger than those on the under parts. Examination of the larger area does not bear out Lambe's belief that "The plates

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PLATE No. 1
Impression of Integument of *Chasmosaurus* 1/11 feet above the pelvic arch and the right tank. No. 2245 Victoria Memorial Museum.

increased in size toward the somewhat central one, which was largest." However, there is evidence of a uniform increase in size among some loose fragments. These fragments are probably from the under parts as they show only the smaller tubercle-like scales.

The large round plates are arranged in irregular, longitudinal rows and are spaced from two to four inches apart. They vary considerably in size and are not always distinctly differentiated from the larger polygonal tubercles either in size or shape. The large plates, one of which is two and one-fourth inches in diameter, were low, flat, circular, and are defined by a circumscribing groove. The edges of many of the larger polygonal tubercles as well as the large round plates have a crinkled appearance due to short, grooves placed at right angles to, and ending at the edge of the plates. Closely surrounding these large plates are smaller polygonal tubercles giving the appearance of a rosette. The intervening spaces were filled with polygonal, tubercle-like, non-imbricating scales of varied but smaller size. In general the larger round plates decrease in size from the dorsal surface of the body downwards over the femur and ischium though the general arrangement seems to be the same.

Brown figures and describes the integument of *Centrosaurus (Monoclonius) cutleri** from the same general region of the body as that preserved in the present specimen. In his specimen the polygonal tubercles seem to be more uniform in size and the large round plates are more widely separated. This may be partly due to the fact that it is from somewhat lower on the body, though it would be expected that animals so different in skull and skeleton structure would have a very different epidermal pattern.

In the area here figured there are none of the small apical tubercles referred to by Lambe. These were thought to have been derived from the under parts and the lack of such scales in the region of the hips and flanks tends to confirm this belief.

As more becomes known about the integument of this interesting family of dinosaurs, it is quite likely that arrangement and size of the scales will be found to differ in each form. It is quite likely that with this varied scale pattern there was a varied color pattern.

*Bull. Amer. Mus. of Nat. Hist., Vol. XXXVII, 1917, p 305, Pl. XVIII.

AN EYE FOR MOVEMENT

By HENRY HOWITT, B.A.



IN A beautiful, moonlight night in August, 1921, I was standing on a white limestone road in a swamp listening to some hounds baying in pursuit of an American Varying Hare (*Lepus americanus*). Suddenly I saw the hare sinuously jump through a snake fence among the weeds bordering the road and run swiftly up the bank directly in front of me. I never moved, and the hare seemed not to appreciate I was alive. Without pausing a moment he leaped across the road, almost brushing my legs as he passed, and it was only as he nearly touched me, and possibly got my scent, that he twisted in his course and was gone.

Last fall I was on a wagon track in a wood, my beagle searching the adjoining cover. He gave tongue, and, happening to look down the track in his direction, I saw a Cotton-tail Rabbit (*Sylvilagus floridanus*) approaching. The rabbit silently went by on the other side of the track within ten feet, and without even quickening the pace of his leisurely hop, or in any way showing that he did not think I was a tree. Slowly he disappeared around a bend. The only movement I had made was in turning my head to watch him as he approached and passed.

On February 7th, 1925, during an exceptionally mild period and on the same day as I heard my first Crow (*Corvus brachyrhynchos*) of the year, in Guelph Township, Ontario, I saw five Prairie Horned Larks (*Otocoris alpestris praticola*) walking slowly about in some manure which had been scattered lightly over a field. With the aid of eight power, prismatic field-glasses I could see them distinctly. Hearing the whistling of wings overhead, I looked up and saw a Sharp-shinned Hawk (*Accipiter velox*) fly into a tree, the foot of which was about twenty or twenty-five yards from the larks. The hawk perched on a branch twenty-five or thirty feet from the ground. Momentarily I expected him to swoop down on the larks. I remained motionless. So, apparently, did the larks for, although I searched their location thoroughly with my glasses, they never moved, and I was unable to distinguish the protective colouring of their grey-brown-streaked bodies from the manure upon which they crouched. Entranced by this natural phenomenon, I remained to watch. The hawk's scrutiny was evidently no more successful than mine, for in about five minutes he flew to another tree at the edge of the field, 150 or 200 yards distant, and perched about

the same height as in the first. All the players in the little drama again played their parts exactly as before, and with the same result. At the expiration of a second five minutes the hawk flew on, and after about another five the larks rose from the exact spot I had last seen them, flew singing over the place where I was standing, and disappeared in the direction whence the hawk had come, and in the exactly opposite direction to that in which he had gone.

I have sat in a punt in a duck marsh, with gun across my knees, waiting for the ducks to come in, and have seen them, like small aeroplanes in the sky flying fast straight towards me; but as I raised my gun to be ready, they immediately swerved out of range. They had a vast marsh to survey, but saw the slightest movement.

On March 21st, 1925, the River Speed below Guelph was in flood, and its high and rushing waters appeared as they may have done a century ago before the forests fell and the sun dried up the creeks. In the eddying back-water of a small

bay swam a pair of those beautiful, scarce migrants, Hooded Merganser Ducks (*Lophodytes cucullatus*), the drake's white, black-rimmed, Greek warrior-like crest, striking, black, white and chestnut, nuptial plumage, black bill, and yellow eyes making an astonishingly brilliant show, comparable to that of the tulip and other gay, spring flowers, and in marked and sudden contrast to the recent dullness of winter. As I rounded a clump of cedars on the bank I saw them, and stood still without cover. Fortunately, at that moment the backs of their heads were towards me. They were not more than twenty-five yards distant, turned and approached, and for several minutes I had a good view through my glasses before a trapper quietly came out of some trees behind me and the visitors promptly flew away.

All wild animals are either hunters or hunted, many both; and through the survival of the fittest in the course of natural selection, their eyes have become quick to catch movement.

THE BISON AND ITS RELATIONS

By CHARLES M. STERNBERG



THE FOLLOWING notes were prepared in answer to a responsible personal request. It was thought that they might be of interest to readers of *The Canadian Field-Naturalist*.

The family *Bovidae* includes the antelopes, sheep, goats and bovines, (cattle and buffaloes).

In the sub-family *Bovinae* are placed pigmy buffalo, African and Indian buffaloes, gayal, zebu, gaur, yak, domestic cattle and bison. The family dates back to Miocene times but the sheep and oxen did not appear until the Pliocene.

The musk-ox forms a connecting link between the *Caprinae* (sheep and goats) and the *Bovinae*.

There were about a dozen species of *Bovinae* scattered over Asia, Africa, and Europe many of which are now extinct. In this sub-family the horn-cores may be round, flattened, or angular and are frequently directed outward but never curved spirally, inward, or of the corkscrew shape. The buffaloes of India and Africa are characterized by their angular horn-cores and the great convexity of their forehead in the most typical forms. In bison, represented by *Bison bonasus* (the European bison) and *Bison bison* (the American bison) the skull is characterized by its great relative width and shortness, the tubular orbits, the moderately convex fore-head, and the curved rounded horn-cores which are placed considerably below the level of the occiput. The European species is represented in the Pleistocene of Europe by a variety *Bison priscus*. A cranium from the

Sivalik Hills, India, has been referred to the genus as *Bison sivalensis* and appears to be allied to modern forms.

The genus *Bos* of the old world is the most specialized representative of the sub-family. In this genus are placed the wild oxen of India and Burma which are characterized by more or less flattened horn-cores. The earliest representative of this genus is *Bos etruscus* from the upper Pliocene of Europe.

Bison arrived in America in mid-Pleistocene times or during the warm inter-glacial period. They were the only members of the ox tribe to reach America and they did not extend into South America. The earlier forms are found associated with mastodon, the Columbian elephant, and the great ground sloth. There were seven species of bison in North America, of which, apparently, the first to arrive was the great *Bison latifrons* one specimen of which has a spread of over six feet from tip to tip of the horn-cores. Bison has been found from Alaska to Florida. It can not be stated whether all the species were contemporary but it is quite certain that one, *Bison occidentalis*, found in Alaska and Kansas, was contemporary with the modern species. At the present the old world has but one species, *Bison bonasus*. Bison differs from the true oxen in the skull, shoulder hump and hair. At present there are two sub-species of bison living in North America, i.e., *B. bison typicus* (plains bison) and *B. bison athabasca* (wood bison).

NOTES AND OBSERVATIONS

THE ANNUAL MEETING OF THE ROYAL SOCIETY OF CANADA will be held in Ottawa, on May 19, 20, 21. In Section V—Biological Sciences—the Presidential Address will be delivered by Professor Andrew Hunter of the University of Toronto, his subject being "Proteolysis and the Structure of Proteins". The program includes fifty-eight titles grouped under three headings: Zoological; Medical, Physiological and Biochemical; Botanical.

THE HERRING GULL AT QUEBEC IN WINTER.—A Herring Gull was observed by me near the waterfront of the city of Quebec from time to time during the winter of 1924-25 until January 29th, when it was seen flying around quite unconcernedly. I noticed the bird particularly during the extreme cold weather of twenty below zero and thereabouts.

On February 24th, 1925, I again saw a Herring Gull at Quebec. I do not think that this was the Gull seen earlier in the winter, as it was much whiter than that one.—REX MEREDITH.

SOME NOTES ON THE KILLDEER PLOVER AT BROCKPORT, N.Y.—The article in *The Canadian Field-Naturalist*, Vol. 38, No. 10, on the Killdeer Plover, by Theed Pearse, recalled to the writer's mind similar "displays" repeatedly observed during August, 1924. Working in the open at a vining-station, many occasions were offered to observe the actions of this bird.

One morning a pair (?) was seen approaching over-head, and, as they neared the locality where the men were working, one (sex unknown) plunged toward the ground with irregular and unsteady flight. Reaching the ground, it limped along and dragged the right wing for about twenty feet and then tumbled over on its head in a manner similar to that described by T. P. The writer, observing this for the first time, approached the bird, but was surprised to see it rise and join the other bird overhead. Two days later, a bird (presumably the same) came down in the same manner as that previously observed and after limping a short space, sat on the ground. It was approached within ten feet before resuming flight. In the afternoon of the same day the bird came down again. This time it "landed" in the center of a circle of men who were watching a game of horse-shoes being played, and five feet from one of the players. When the men overcame their astonishment, one of them hurled a stone at the bird which then resumed its flight.

It is the writer's belief that this was a male bird and that the peculiar "antics" were a sexual display. I have it in my notes that the female (?)

was always near at these occasions. Since the first brood was at that time the size of the old birds and on the wing, the bird was not trying to protect its young by luring the men away. It was never observed to act this way when alone in the fields. I did not, however, have opportunity to watch the bird for any length of time. It was also not accurately ascertained whether it was the male or female bird that came down each time.—GORDON HILLGARTNER.

NOTES ON WINTER BIRDS.—Speaking generally, bird life has been scarce this winter. Two species, the Northern Waxwing and the Redpoll, which are usually our commonest winter residents, have been almost entirely absent. A few of the former appeared on November 12th and 13th, and of the latter on December 11, but they were evidently migrating, and by New Years all had disappeared. The severe weather in December brought a considerable number of Snow-buntings around the buildings of this ranch. Twenty years ago these birds were more often seen in this valley, but since the "benches" have been settled up they remain in the higher levels, only visiting us when driven down by storms. The same applies to the Lapland Longspur, but these are even more loth to descend, and it takes a winter indeed to have Longspurs hopping about the yards. In recent years the Horned Lark has become a year-round resident. Already the males are in full song, and appear to be only awaiting the passing of the snow to start nesting operations. The most notable visitor this winter has been the Pine Grosbeak. As a rule this bird confines itself to the thicker bush, but this time I have noted scattered bands in several places where I have never seen them before. I understand that Pine Grosbeaks have been scarce in many parts of Saskatchewan, which may account for their greater numbers here. On March 1st I had the pleasure of hearing for the first time a Grosbeak singing. I saw the bird, which was in the grey immature (?) plumage, fly into the top branches of a poplar, where it sang continuously for a couple of minutes. Perhaps I may never hear the song again, for I believe the bird is not an habitual songster, particularly south of its breeding grounds. Farther up this river where the bush is heavier, at one ranch on February 12th I noted about twelve Tree Sparrows, and at another there were some half-dozen Rusty Blackbirds wintering. The latter bird has remained all winter before, 1910-1911, but the Tree Sparrow is a new recruit, I think. Winter started here without notice in no uncertain fashion on November 4th and lasted some weeks without

let-up, and it is quite possible these Sparrows were caught and decided they had better remain where they were. Once in a way a few Rosy Finches appear about November and frequent our corrals along with the Redpolls, but there have been none since the winter of 1921-22. Downy Woodpeckers are rare in this neighbourhood; I have seen two only this time. Two years ago a couple of Flickers wintered at a ranch about eight miles away. We have the Magpie, of course, in plenty. They are bold, cheeky birds, but it can be said in their favor that they consider Canada is good enough for them 365 days in the year, and we should be dull without them. Whereas they are fond of perching on the backs of the cattle, presumably to keep their toes warm, it is very rare indeed, in my own experience, that an individual bird gets the habit of pecking at the brands. On the other hand, I think they must do some good by digging out warbles, though the cow does not enjoy the operation. On November 14th, we watched a Gyrfalcon flying overhead. Its white plumage with the black wing tips were very conspicuous in the bright sun. Golden Eagles are not uncommon. Last fall I watched with amusement one of these birds having a very bad time from a flock of some fourteen Magpies. It had settled on a knoll, and in a moment was surrounded by a chattering mob which gave it no peace, compelling the great bird to rise again into the upper air where the Magpies could not follow. The Sharp-tailed Grouse, which some ten years ago became so scarce, seems to be coming back. Five Sage Grouse spent December and January close by, and I used to see them frequently; on one occasion two of them were squatting in the centre of the railway track. Further down this river below Eastend, where the valley widens out into great flats, the sage grouse is still plentiful, and I believe most landowners take a pride in them and endeavor to prevent any shooting as far as they can. The little Grey Partridge is now established in the district, though not in any numbers as yet. I saw my first pair last spring on May 21st, and this winter have noted half a dozen now and then. They seem very wary and do not allow close approach, even when I am on horseback, and the long and severe winter seems to have bothered them not at all. I fancy they must make an easy living on Russian thistle and other weed seeds.—L. B. POTTER, Eastend, Saskatchewan.

COMMON CORMORANTS NESTING IN THE MAGDALEN ISLANDS.—On May 15, 1924, I proceeded in a motorboat from Amherst Harbor, Magdalen Islands, to a point on the water in front of the cliff, about 150 feet high, which forms the north-east corner of Entry Island, of the Magdalen

group. On small ledges, about half-way up the face of the cliff, were a number of Common Cormorants (*Phalacrocorax carbo*) and their nests, which I studied at leisure through binoculars (X6), as the motorboat, with engine stopped, floated quietly on the swell. They were sheltered from above by an overhanging bulge of rock, while below them the cliff dropped sheer into the water. I counted seven nests that appeared to be occupied and thirteen Cormorants. As the birds stood on the ledges their white throats and white flank patches were seen to be very large, white, and conspicuous. The white flank patches were also very conspicuous when the birds soared in the air.

The fishermen who accompanied me said that the Cormorants nested at this cliff every year and were never disturbed.

The common Cormorant is now known to nest in North America at two places, viz., Lake Island, Saguenay Co., Quebec, and Entry Island, Magdalen Islands, Quebec.—HARRISON F. LEWIS.

A JUVENILE RICHARDSON'S OWL FROM GRAND MANAN, N.B.—Mr. R. W. Tuft's account* of the nesting of Richardson's Owl, *Cryptoglaux funerearichardsoni*, in the Grand Manan group, New Brunswick, reminded me that I had a juvenile specimen from the same locality. It was taken at Grand Manan on June 22, 1922, and sent to Mr. Tufts in the flesh. Although in bad condition for preparing as a specimen, it was recognized as being an interesting plumage, and saved by him. Both the size. Length 8½ (R.W.T.), Width 6.1 (H.L.), and the plumage mark the specimen as a juvenile, and no doubt it was raised in the vicinity where captured. The description of the immature of this species given in Chapman's handbook fits the case exactly.—HOYES LLOYD.

BANDING OF THE BALTIMORE ORIOLES.—On May 22nd, 1924, I observed a male Baltimore Oriole in one of my traps at 140 Luxton Ave., Winnipeg, Man., and after due consideration decided to hold him as a decoy for a short period and the following is an idea of the results of my experiment.

The Oriole was placed in a large cage and while under my care was fed with Oranges, Bananas, meal-worms and plenty of fresh water. All the trap cages were baited in a similar manner but as the weather was rainy and cold I had no success until May 27th (when a change in the weather was apparent) they came in numbers. The decoy kept up, during this period, from morn till night a persistent call which sounded to my ears like "come here" (repeat). The new arrivals hopped

**Canadian Field-Naturalist*, XXXIX, April, 1925, p. 85.

into the traps without any ceremony whatever.

In all I banded 34 Orioles from May 27th until July 13th, with the same decoy. On June 6th, No. 241,936 was released at 5 p.m. from the City Hall, Winnipeg, and on the following day was back once more in the traps and he was again released at once and after a few days was observed to have made a nest about 500 yards distant from the traps in a large Maple Tree, he remained there with the hen which was also banded; No. 241,938, during the entire summer months and reared three (3) young, but I was not fortunate in banding them. The decoy kept calling all the time during the day, those in the tree answering. As the Orioles were released out of the traps they at once made for the large Maple Tree where No. 241,936 had his nest, but he never let them get nearer than about 200 yards and after a short, but sharp struggle he drove them away.—PAUL KUNTZ.

TWO WINTER RECORDS FROM WOLFVILLE, NOVA SCOTIA.—On December 24, 1924, I saw in an orchard in Wolfville a small Sparrow which I at first thought to be a Tree Sparrow, but which, on close inspection, failed to reveal the characteristic black mark on the breast. Consequently, I collected it. It proved to be a female Chipping Sparrow in fairly good condition. Here at Wolfville the Chipping Sparrow is usually a summer resident from the first of May until the first part of October, this being the first winter record of this species known to me.

On January 17, 1925, I observed about thirty Lapland Longspurs on the Grand Pré meadow near Wolfville, and again on January 29 I saw eight, two of which I collected. The only other record of this species in this locality is one by R. W. Tufts, who states that from February 8 until March 2, 1916, they were frequently observed in small numbers on the Grand Pré, several specimens being taken.—A. L. RAND.

A MYSTERY BAND SOLVED.—The Canadian National Parks Branch, which keeps a record of all wild bird banding operations of interest to Canada, has had brought to its attention an item from *The Free Press*, St. John's, Newfoundland. This item gave an account of a bird locally called a "Ticklace", which was killed on August 12, 1924, by Mr. L. Curtis, of Horse Island, in the District of St. Barbe, Newfoundland. On the bird was found a thin silver band said to be inscribed with the words: "Inform Witheberry High. Holdron, London".

On writing to Messrs. H. F. & G. Witherby, 326 High Holborn, London W.C. 1, England, it has now been learned that this ring, No. 67,423, was put on a young Kittiwake (*Rissa tridactyla*),

on June 28, 1923, on the Farne Islands, Northumberland, England, by one of Mr. Witherby's correspondents. Mr. Witherby stated that the foot of the bird was examined by Mr. W. C. Henderson, of the United States Bureau of Biological Survey, and was pronounced by him to be that of a Kittiwake, which agrees with Mr. Witherby's records. The record is extremely interesting, more especially as this bird is the first under Mr. Witherby's ringing scheme—which has been in operation for sixteen years—reported from this side of the Atlantic. The correct lettering on the band was "Inform Witherby, High Holborn, London".—HOYES LLOYD.

ON THE WINTERING OF *Perdix perdix* IN ALBERTA, 1924-1925.—The following facts appear to me to be of sufficient interest to warrant publication.

The Hungarian Partridge (*Perdix perdix*) has been increasing very steadily since its introduction into the south of Alberta some fifteen years ago. In the last year or two more introductions have been made in the north central portions of the Province, chiefly for the sake of fresh blood, as the birds had already spread into this district. Climatic conditions seem to suit them admirably, and not even the severest winters appear to have had any detrimental effects upon them. But this year there has been quite a high rate of mortality in many localities. The ultimate cause has undoubtedly been the heavy snowfall.

Partridges have been picked up dead along the railway tracks in large numbers. One section foreman has picked up about sixty on his section alone, whilst another has picked up even more. Similar reports, that have not yet been verified, however, are plentiful. All the birds were reported as being in excellent condition. Various samples have reached the Scientific Committee of the Northern Alberta Game and Fish Protective League for examination. Of a batch of six, picked up together near Blackfalls, four were submitted to us. These had all met violent deaths, injuries ranging from a cracked skull and broken back to broken wings and crushed legs, the birds being otherwise in prime condition. Since the injuries had all been received from the same side, the obvious inference to draw is that the birds had roosted in the railway bank in covey formation and had flown into a passing night train, possibly making deliberately for the headlight of the engine.

This view has received ample corroboration from various other specimens examined and from information derived from many sources. Thus, Mr. Dan. MacDonald, a locomotive engineer, and an exceptionally observant member of the Game League, has kindly sent me the following in a

letter, which deserves full quotation:—

"On winter nights, and especially when the weather is stormy, coveys of partridge lie close together for shelter in the cuts that contain a lot of snow. They remain there until a train is very near them, when they rise. The powerful headlight of the locomotive seems to blind them and they fly straight in the direction in which they arose. Many of them strike against the engine and are killed.

"In daylight I have noticed the Hungarians remaining on or near the track until the engine was as nearly upon them as at night time but they would rise and fly away in safety to the side of the track or a considerable distance ahead before alighting.

"A number of them being found dead together, as if smothered, might possibly be due to a snow-plough having been run through these cuts. The flying snow and ice would strike their shelters with considerable force and stun them, or they could be covered so deeply by a heavy layer of snow thrown up by the plough that they would be unable to get up and so perish."

The last paragraph refers to the finding of whole coveys (in one instance numbering sixteen birds) dead in the banks.

There seems little doubt that the partridges have been attracted in many parts of the Province to the railways. A combination of open ground on the tracks and a more or less constant supply of wheat (loss from the grain cars), with deep snow and lack of food in other parts, has induced the Hungarians to make the railway tracks their headquarters. They are so addicted to the tracks that they even roost in the snowdrifts on the banks. Prairie Chicken (*Pediacetes phasianellus*) share this good feeding ground in some numbers with the Partridges, but we have been unable to trace a single case of a chicken being killed or injured. They evidently do not go to roost in the railway banks. There seems no doubt that the damage to partridges is done entirely at night.

Hungarian Partridges have also been finding feed to some extent on poultry farms during the recent winter. But it is interesting to speculate as to the effects that the heavy snowfall might have had on the species if the railways did not exist or if they never moved grain. It seems probable that in spite of the heavy toll they have taken, they have saved the race from even greater decimation.

Three of the birds examined by us were weighed and found to turn the scales at 13, 14 and 14 ounces respectively. In view of the fact that the Alberta birds are universally considered to be smaller than the common partridge of England, whose average weight is 13 ounces, these figures

are particularly interesting. These birds were killed in March, at the end of a very long and particularly severe winter.—WILLIAM ROWAN.

NOTES ON GROUSE AND WOODCOCK CONDITIONS IN NOVA SCOTIA, SPRING, 1923.—The winter of 1922-23 in this Province was characterized by an unusually heavy snow fall which continued into April. From personal observation and from many reports received from reliable sportsmen it would appear that both Ruffed Grouse and Woodcock were adversely affected by this unusual weather condition.

There is no doubt that the grouse have suffered a diminution in numbers, a fact apparently ascribable in some way to the severity of the season. It was not due to any food shortage, since these birds at this season feed largely on buds and berries which were available in normal quantities, there being no sleet storms throughout the winter to encase the branches and thus deprive the birds of this particular food supply. Nor would their habit of diving under the snow and becoming imprisoned by crust, thus dying from starvation and exhaustion, account for the fatalities among them, since there were no sudden thaws and consequently no formation of crust during the season noted.

Nevertheless a general scarcity began to be noted in the early spring. During May and June of the current year the writer spent three weeks in Annapolis County in a section where grouse naturally abound in large numbers and where hundreds had been seen during the hunting season of the previous autumn. During this three weeks only about a half-dozen grouse were started and to hear the drumming of the cock was a matter for comment. While traversing the barrens and covers with my guide we happened upon the unutilized remains of no less than four. This man is a keen observer and an accurate student of wild life. He had worked in the woods during March and April, covering wide areas on snow-shoes every day. He stated that he had found literally dozens of dead grouse especially during the latter part of April. These he stated were resting on little pedestals of ice and snow, their bodies protecting these supports from the rays of the sun. Sometimes several would be found near together. His theory was that the birds, having sought shelter by diving as is their custom, had eventually been buried by the weight of snow which had drifted in from the wind-swept barrens after days of continuous blizzards and had thus found it impossible to work their way out. He predicted a general scarcity of the birds this autumn and time has proved the correctness of his forecast.

The hatching season of the first part of June was favorable, but from practically all over the Province came the same report—grouse absent or rare; and the writer's own experience in Annapolis and Kings Counties during October confirmed these.

The woodcock suffered from the lateness and inclemency of the spring and it was believed by some that the casualties among them had approximated calamity. These birds normally return from the south during the latter part of March. They are dependent for food on earth worms and small grubs which they procure from the soft mud of the swamps and bogs which they frequent.

This year, in spite of the wintry conditions still prevailing over the Province, a large flight of woodcock came back on schedule time. Their favorite haunts were covered with ice and snow and considerable numbers were reported found dead or in such a weakened condition from lack of food that they were unable to fly. None of those picked up had been killed by wires. Two were seen on several occasions on cold days trying to feed in the soft earth formed by a hot water seepage at the Acadia Sugar Refinery near Halifax. Several were reported probing in manure piles close to farm-yard barns. These conditions obtained for about two weeks and it is reasonable to assume that a considerable percentage of this advance flight perished.

It is fortunate that later flights did not arrive till after the food crisis had passed.

A favorable breeding season ensued followed by an excessively dry summer. The migration was carefully noted this autumn over the Maritime Provinces, over a hundred questionnaires being sent out to sportsmen particularly interested in woodcock hunting. From these the impression was gained that the New Brunswick flight was somewhat larger than was anticipated, but that in Nova Scotia it was considerably below the average. How much prevailing easterly winds may have had to do with this difference in numbers I am naturally not prepared to say. The diversity of opinion revealed by the answers to the questionnaire, as to the numerical status of this bird was very pronounced and would seem to render the findings of slight scientific value.—R. W. TUFTS.

THE KINGBIRD IN ANTICOSTI IN 1924.—On August 1, 1924, Mr. M. W. Armstrong and I saw a Kingbird (*Tyrannus tyrannus*) in a tree-top near Lake Gamache, at Ellis Bay, Anticosti, Quebec. The tree in which the Kingbird was perched was close by the side of a road, and, as we walked toward it along the road, with a bright sun shining from behind us, we saw with the utmost clearness the size, dark upperparts, white underparts and

white tail-tip which characterize this familiar species. The only previous record of the Kingbird in Anticosti is that by Dr. Schmitt of two individuals taken May 7, 1902, at English Bay.—HARRISON F. LEWIS.

FURTHER NOTES ON THE WILLET IN NOVA SCOTIA.—According to early records the Willet (*Catoptrophorus Semipalmatus*) was known to breed in favorable localities along the eastern seaboard of North America from Nova Scotia to Virginia. It would appear, however, that with the advance of civilization and its attendant agencies inimical to bird life, these birds became greatly reduced or entirely extirpated throughout the greater part of their former breeding range.

In his Handbook of 1910, Dr. Frank Chapman, referring to the nesting of the Willet says “. . . formerly bred in Nova Scotia”. The fact is that these splendid birds have never been exterminated in this Province, though we are convinced after consulting many of the older residents of the districts still frequented by Willet that their numbers have suffered a very serious reduction with the passing years.

During the summer of 1922 several surveys were made throughout that section of the Province where they are known to occur, for the dual purpose of ascertaining as true an approximation as possible of the number of birds still present and for the acquisition of additional data respecting their habits and actual distribution. The result of this report was published in *The Canadian Field-Naturalist* of November, 1922, and estimated the number of Willet at the close of the 1922 breeding season at 736 inclusive of that year's increase. If any gross error has occurred in this estimate it has been on the side of conservatism. It also stated that the breeding areas were confined to the coastal regions where feeding conditions were favorable, from the head of St. Mary's Bay in Digby County south-westerly throughout Yarmouth and Shelburne Counties and to the southern border of Queens County at St. Catherine's River near Port Mouton.

The districts above described have been under surveillance during 1923 and 1924 and the impression gained from the most careful survey would seem to be that the numbers are not increasing. For instance the notable colony at the head of St. Mary's Bay scattered over approximately six hundred acres, which is segregated from all other colonies and therefore lends itself to more accurate census taking, showed no increase during 1923. On the other hand, in June, 1924, an appreciable decrease was noted, on which occasion only seventeen birds were observed as compared with forty in 1922, conditions being equally favorable

in both cases. In the Chebogue (Yarmouth County) district, which, in contrast to the more concentrated area along St. Mary's Bay is straggling and ill-defined in its limits, thus presenting greater difficulties for accurate observation and counting of individual birds, a similar conclusion was reached.

During 1923 and 1924 three new colonies were discovered and a careful census taken. The first was on June 5th, 1923, at St. Catherines River, Queens County, where about twenty pairs were found breeding on upland barrens one-half mile from salt-water marshes. On June 7th of the same year another small colony was discovered at Pinkney's Point, Yarmouth County, with presumably not more than four pairs in evidence. The third was at Pubnico Harbor on the border of Yarmouth-Shelburne Counties, where, on the 11th June, 1924, fourteen birds were counted at one time.

The Willet returns to Nova Scotia about May 1st and is rarely seen later than September 10th. They begin to nest by the middle of May. Though their feeding grounds are the salt-marshes and muddy inlets along the shore they often nest in the open pastures or on the rough boulder-strewn uplands at a considerable distance inland. It is no uncommon sight to see the adult birds flying overhead on their way to and from the feeding grounds, uttering their characteristic cries as they go. Of the seven nests, however, which it has been my good fortune to find, all have been on low land close to the feeding grounds. One at St. Mary's Bay was located only a few feet above the high water mark, well concealed in the coarse marsh grass of the year before. All were mere depressions in the ground, beautifully lined with smooth, dry grasses and invariably concealed by a tangle of grasses, weeds or low bushes. Two nests examined contained five eggs each. One of these clutches was just hatching and it was observed that one of the eggs was infertile. The other sets contained four eggs each, which I believe to be the usual number.

As an intruder approaches a nesting colony it would appear that the sitting birds, alarmed by the cries of their mates, quietly leave the nest and join the clamor in the air, thus facilitating the possibility of an accurate count, while at the same time making it a matter of considerable difficulty

to locate the nest. After circling about in the air for some moments they gradually retire to some available vantage-point—boulder, roof, telephone post, hay-rick, etc., where they perch and continue their protest, displaying, however, little or no evidence of fear. As the unwelcome visitor nears their nest or the young in the grass they often become exceedingly bold, darting angrily within a few feet of one's head. Reassured by the retreat of the invader, the female after an appreciable interval, drops to the ground and thence runs under cover to her nest which may be one hundred yards or more distant. These tactics account for the difficulty in locating the nest.

On June 19th, 1923, a nest located under a tangle of wild-rose bushes was discovered in a pasture at East Chebogue, Yarmouth Co. The bird sat so close that by approaching her quietly I was actually able to remove her from the nest with my hand. Band number 104,492 (Biol. Survey) was then attached to the leg during which process she betrayed very little nervousness.

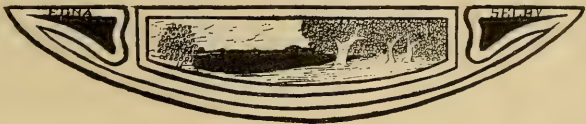
The Willet is known throughout its Nova Scotia breeding range by a variety of names which vary locally. The more common of these are "White Wings", "Pillo-wee", "Cluey", "Pill-will-willet," "Humility" and "White-winged Curlew".

As evidence of their former abundance a middle-aged resident of Little River, Chebogue district, told me last summer that in his youth he was accustomed to hear his father refer to the days when "Cluey's" eggs were gathered in basket-fuls for household use by the members of his family. It is pleasing to note that in these more enlightened days, in the communities where the birds still occur, the residents seem disposed to protect them and in some cases take an active interest in their preservation. It would seem that the apparent decrease noted above cannot be ascribed to any persecution they suffer while on their Nova Scotia breeding ground.—R. W. TUFTS.

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EDITOR, *The Canadian Field-Naturalist*,
Ottawa, Ontario.

At the risk of cluttering the pages of *The Naturalist* with useless repetition, I want to add to Mr. Harper's, my earnest protest against the proposal to ship some of the surplus Plains Buffalo from Wainwright to the Peace River district to augment the Wood Buffalo, already there.

From the standpoint of the nature student, this would be a calamity of colossal proportions. Our two little herds of Wood Buffalo are apparently gaining a little in numbers and with the whole-hearted protection that has been given them, may even increase to the limit of the capacity of their habitat; it would be a dreadful thing to have the last absolutely wild examples of this noble animal degraded by being crossed with a smaller subspecies. Crossing would undoubtedly take place, and it might be that, with the reduced stamina of the hybrids, the progeny might become so weak that the whole race might pass out within a decade or two.

There are so many examples the world over, of calamitous results arising from the interference of man with native fauna, that one can only suppose that the promoters of this scheme to mix the blood of the two Buffalo, have not sought advice from any student of Natural Science. A step so serious should not be taken without unanimous approval of a number of men who have made a life study of mammalian fauna, such as Dr. Hornaday and others in New York and Washington.

I sincerely hope that the scheme will be abandoned. It would call for quite a large financial outlay and the money would probably be worse than wasted. It would surely be possible to drive these Buffalo north from Wainwright to unoccupied lands within one hundred miles or more, where they might possibly, though very improbably, re-establish themselves as wild animals. But it would be better to lose the whole Wainwright herd, rather than risk the last remnant of the Wood Buffalo.

W. E. SAUNDERS.

London, Ont.

April 13, 1925.

EDITOR, *The Canadian Field-Naturalist*,
Ottawa, Canada.

We desire to bring to your attention the following resolution, adopted April 10 at the annual meeting of the American Society of Mammalogists—an international organization containing over seven hundred members. We trust that you will take such energetic action in the matter as seems appropriate.

WHEREAS plans have been made for introducing large numbers of Plains Buffaloes annually into the Wood Buffalo Park of Northern Alberta, and whereas the American Society of Mammalogists, a professional Society of international membership, including practically all field-naturalists who are interested in mammals, feels that serious results would occur from carrying out the above plan, viz:

A. Interbreeding would take place between the races of Plains Buffalo and Wood Buffalo, so that the distinctive characteristics of the Wood Buffalo would be lost in a few generations and in this way the largest and noblest game animal of North America would pass out of existence as such.

B. The new arrivals and the mixed descendants of the two races of Buffaloes would be less fitted to carry on the struggle for existence in northern Alberta than is the native race of Wood Buffalo.

C. Tuberculosis and other diseases would be likely to be transmitted with harmful effects to the northern herd.

D. Owing to the restricted range of the Wood Buffaloes and the limited amount of food available, overcrowding would follow so that the proposed plan would afford only a temporary means of disposing of Plains Buffaloes; therefore be it,

RESOLVED, That the American Society of Mammalogists express its earnest hope that some other means may be found of disposing of the surplus Plains Buffaloes, and be it further

RESOLVED, That copies of this resolution be forwarded to the Department of the Interior of Canada and to the organizations interested in wild-life conservation.

Very truly yours,

A. BROZIER HOWELL,

Corresponding Secretary.

Washington, D.C., April 13, 1925



OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS**(Continued from page 83)*

BLACK DUCK, No. 296,446, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was killed on the eastern branch of the Cooper River, Berkley County, South Carolina, on December 8, 1923.

BLACK DUCK, No. 296,457, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was shot in the same vicinity, on October 11, 1923.

BLACK DUCK, No. 296,460, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was shot at the Currituck Shooting Club, Cape Henry, Virginia, on January 22, 1924.

BLACK DUCK, No. 296,463, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was killed on the Potomac River, twenty miles below Washington, D.C.—no date given, but reported on December 13, 1923.

BLACK DUCK, No. 296,484, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was killed near Bainbridge, Missouri, on December 6, 1923.

BLACK DUCK, No. 296,489, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was killed at Dike, Virginia, on December 4, 1923.

BLACK DUCK, No. 296,495, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was shot at Oshawa, Ontario, on October 13, 1923.

BLACK DUCK, No. 297,157, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was killed on Jacobs Lake, Arkansas County, Arkansas, on November 17, 1923.

BLACK DUCK, No. 297,162, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot on Reelfoot Lake, Tennessee, on November 20, 1923.

BLACK DUCK, No. 297,167, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot by a resident of Toronto, Ontario, on November 15, 1923, but the exact locality of shooting was not given.

BLACK DUCK, No. 297,182, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot in a marsh of the Winous Point Shooting Club, near Port Clinton, Ohio, during the week of November 18, 1923.

BLACK DUCK, No. 297,184, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot in the same vicinity, on October 10, 1923.

BLACK DUCK, No. 297,205, banded by H. S. Osler at Lake Scugog, Ontario, on October 2, 1923, was killed on the "True Blue" Plantation, near Georgetown, South Carolina, on November 30, 1923.

BLACK DUCK, No. 297,210, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot in the same vicinity, on October 25, 1923.

BLACK DUCK, No. 297,214, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot in Twenty Creek, near Smithville, Ontario, on November 1, 1923.

BLACK DUCK, No. 297,226, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was killed on the Woodside Pond, Guilford County, North Carolina, on November 19, 1923.

BLACK DUCK, No. 297,246, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot at a place fifty-five miles north of Peoria, Illinois, on October 24, 1923.

BLACK DUCK, No. 297,250, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot on Long Point Island, Lake Erie—no date given, but reported on December 4, 1923.

BLACK DUCK, No. 297,272, banded by H. S. Osler, at Lake Scugog, Ontario, on October 3, 1923, was shot at a place about two miles from Caesarea, Ontario, on October 16, 1923.

BLACK DUCK, No. 297,273, banded by H. S. Osler, at Lake Scugog, Ontario, on October 3, 1923, was killed at the Fin & Feather Club, about eleven and one-half miles south-east of Dallas, Texas, on October 25, 1923.

BLACK DUCK, No. 297,282, banded by H. S. Osler, at Lake Scugog, Ontario, on October 3, 1923, was shot in the Frenchbroad River, thirty miles south-east of Knoxville, Tennessee, on December 15, 1923.

BLACK DUCK, No. 297,290, banded by H. S. Osler, at Lake Scugog, Ontario, on October 3, 1923, was killed at Morgana, South Carolina—no date given, but reported on December 10, 1923.

BLACK DUCK, No. 297,302, banded by H. S. Osler, at Lake Scugog, Ontario, on October 3, 1923, was shot in a small marsh just east of Valentia, on Lake Scugog, Ontario, about October 25, 1923.

BLACK DUCK, No. 297,306, banded by H. S. Osler, at Lake Scugog, Ontario, on October 3, 1923, was killed at a place six miles west of Carrier, Mississippi, on November 4, 1923.

BLACK DUCK, No. 297,336, banded by H. S. Osler, at Lake Scugog, Ontario, on October 4, 1923, was caught in a marsh on the Trent River, near Frankford, Ontario, during the spring of 1924, before May 5, 1924.

BLACK DUCK, No. 297,339, banded by H. S. Osler, at Lake Scugog, Ontario, on October 4, 1923, was shot at Port Clinton, Ohio, on November 21, 1923.

BLACK DUCK, No. 297,341, banded by H. S. Osler, at Lake Scugog, Ontario, on October 4, 1923, was killed on the Elk River, Maryland—no date given, but reported on January 3, 1924.

BLACK DUCK, No. 297,344, banded by H. S. Osler, at Lake Scugog, Ontario, on October 4, 1923, was shot on "Wrack Island", Rice Lake, Ontario, on November 2, 1923.

BLACK DUCK, No. 297,355, banded by H. S. Osler, at Lake Scugog, Ontario, on October 5, 1923, was shot on Big Murphy Island, at the mouth of the South Santee River, South Carolina, on November 12, 1923.

BLACK DUCK, No. 297,357, banded by H. S. Osler, at Lake Scugog, Ontario, on October 5, 1923, was killed at a place four miles south-east of Fulton, Arkansas—no date given, but reported on January 28, 1924.

BLACK DUCK, No. 297,358, banded by H. S. Osler, at Lake Scugog, Ontario, on October 5,

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1923, was killed at a place twenty-five miles east of Bristol, Virginia, on December 8, 1923.

BLACK DUCK, No. 297,374, banded by H. S. Osler, at Lake Scugog, Ontario, on October 6, 1923, was caught alive in a trap and afterwards killed, at Johnson's Bayou, Louisiana, on December 3, 1923.

BLACK DUCK, No. 297,380, banded by H. S. Osler, at Lake Scugog, Ontario, on October 8, 1923, was shot at Hall's Mill Creek, Mobile, Alabama, on November 11, 1923.

BLACK DUCK, No. 297,407, banded by H. S. Osler, at Lake Scugog, Ontario, on October 9, 1923, was shot at Stewart's Bay, Lake Scugog, Ontario, on October 26, 1923.

BLACK DUCK, No. 297,412, banded by H. S. Osler, at Lake Scugog, Ontario, on October 9, 1923, was shot in "Cheyenne Bottoms", three miles south-west of Redwing, Kansas, on December 15, 1923.

BLACK DUCK, No. 297,420, banded by H. S. Osler, at Lake Scugog, Ontario, on October 9, 1923, was shot at Long Point, Ontario—no date given, but reported on November 10, 1923.

BLACK DUCK, No. 297,424, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was shot on Greenlaw's marsh on the north shore of Lake Ontario, near the village of Pickering, twenty miles east of Toronto, on November 7, 1923.

BLACK DUCK, No. 297,429, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was shot at Sandusky Marsh, Ohio, on December 6, 1923.

BLACK DUCK, No. 297,431, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was shot on Burlington Beach, Township of Saltfleet, Ontario, on December 10, 1923.

BLACK DUCK, No. 297,439, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was killed at Lebanon, Illinois, about twenty-five miles east of St. Louis, Illinois—no date given, but reported on November 8, 1923.

BLACK DUCK, No. 297,443, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was shot in the Ontario Government Park, on the north shore of Lake Erie, about October 22, 1923.

BLACK DUCK, No. 297,656, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was killed on the Edisto River below Jacksonboro, South Carolina, on November 15, 1923.

BLACK DUCK, No. 297,661, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was killed in the same vicinity during the fall of 1924, before November 26, 1924.

BLACK DUCK, No. 297,671, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was killed in the extreme southern part of the eastern shore of Virginia, on November 5, 1923.

BLACK DUCK, No. 297,675, banded by H. S. Osler, at Lake Scugog, Ontario, on October 12, 1923, was killed on the McGee Marsh, twenty miles east of Toledo, Ohio, on October 24, 1923.

BLACK DUCK, No. 297,677, banded by H. S. Osler, at Lake Scugog, Ontario, on October 12, 1923, was shot by a resident of Norris City, Illinois, on December 7, 1923. The locality of shooting is not given.

BLACK DUCK, No. 297,678, banded by H. S. Osler, at Lake Scugog, Ontario, on October 13,

1923, was killed on Reelfoot Lake, Tennessee, on November 16, 1923.

BLACK DUCK, No. 297,682, banded by H. S. Osler, at Lake Scugog, Ontario, on October 13, 1923, was shot at a place about forty-eight miles east of Toronto, Ontario, on October 23, 1923.

BLACK DUCK, No. 297,684, banded by H. S. Osler, at Lake Scugog, Ontario, on October 13, 1923, was killed in Posey County, Indiana—no date given, but reported on March 15, 1924.

BLACK DUCK, No. 297,689, banded by H. S. Osler, at Lake Scugog, Ontario, on October 13, 1923, was killed at a small pond near Owensville, Indiana, on December 3, 1923.

BLACK DUCK, No. 297,690, banded by H. S. Osler, at Lake Scugog, Ontario, on October 13, 1923, was killed in Crooked Lake, Ontario, on November 5, 1923.

BLACK DUCK, No. 297,696, banded by H. S. Osler, at Lake Scugog, Ontario, on October 14, 1923, was shot on Rice Lake, Ontario, twenty miles from Peterborough, on November 10, 1923.

BLACK DUCK, No. 297,699, banded by H. S. Osler, at Lake Scugog, Ontario, on October 14, 1923, was shot in the same vicinity, on November 7, 1923.

BLACK DUCK, No. 297,713, banded by H. S. Osler, at Lake Scugog, Ontario, on October 22, 1923, was shot in the same vicinity, on November 8, 1923.

BLACK DUCK, No. 297,720, banded by H. S. Osler, at Lake Scugog, Ontario, on October 22, 1923, was shot on Wagner's Lake, Ontario County, Ontario, on November 12, 1923.

BLACK DUCK, No. 297,725, banded by H. S. Osler, at Lake Scugog, Ontario, on October 23, 1923, was killed on the Edisto River, South Carolina, on January 17, 1924.

BLACK DUCK, No. 297,735, banded by H. S. Osler, at Lake Scugog, Ontario, on October 24, 1923, was killed in one of the numerous small ponds in an isolated section of Charlotte County, Florida, on November 29, 1923.

BLACK DUCK, No. 297,738, banded by H. S. Osler, at Lake Scugog, Ontario, on October 25, 1923, was killed near the mouth of the Edisto River, South Carolina, on November 28, 1923.

BLACK DUCK, No. 297,749, banded by H. S. Osler, at Lake Scugog, Ontario, on October 29, 1923, was shot on Emily Creek, County of Victoria, Ontario, on November 27, 1923.

BLACK DUCK, No. 297,761, banded by H. S. Osler, at Lake Scugog, Ontario, on October 31, 1923, was killed near Mechanicsburg, Ohio, on December 3, 1923.

BALDPATE, No. 210,511, banded by Reuben Lloyd, at Davidson, Saskatchewan, on September 6, 1923, was killed at Clements, Kansas, on October 26, 1923.

GREEN-WINGED TEAL?, No. 201,323, female, banded by Donald W. Gillingham, on Zone Island, Fraser River Delta, British Columbia, on September 28, 1923, was shot on Sea Island, in the Strait of Georgia, Richmond Municipality, British Columbia, on October 1, 1923.

BLUE-WINGED TEAL, No. 296,350, banded by H. S. Osler, at Lake Scugog, Ontario, on September 25, 1923, was killed in Potomac Creek, Stafford County, Virginia, on November 10, 1923.

BLUE-WINGED TEAL, No. 297,740, banded by H. S. Osler, at Lake Scugog, Ontario, on Octo-

ber 25, 1923, was killed in the same vicinity during the fall of 1924, before November 26, 1924.

PINTAIL, No. 296,307, banded by H. S. Osler, at Lake Scugog, Ontario, on September 23, 1923, was killed in the same vicinity, during the fall of 1924.

PINTAIL, No. 201,312, young male, banded by Donald W. Gillingham, on Zone Island, Fraser River Delta, British Columbia, on September 28, 1923, was shot on Westham Island, British Columbia, on November 18, 1923.

PINTAIL, No. 201,324, young, banded by Donald W. Gillingham, on Zone Island, Fraser River Delta, British Columbia, on September 28, 1923, was shot in the same locality, on October 7, 1923.

PINTAIL, No. 201,308, young female, banded by Donald W. Gillingham, on Zone Island, Fraser River Delta, British Columbia, on September 29, 1923, was shot at Gridley, California, on December 16, 1923.

PINTAIL, No. 201,306, young female, banded by Donald W. Gillingham, on Zone Island, Fraser River Delta, British Columbia, on September 30, 1923, was shot at the north arm of the Fraser River, British Columbia, on October 1, 1923.

PINTAIL, No. 201,307, young male, banded by Donald W. Gillingham, on Zone Island, Fraser River Delta, British Columbia, on September 30, 1923, was killed on the swamps of Westham Island, at the mouth of the Fraser River, British Columbia, on October 1, 1923.

PINTAIL, No. 201,316, young male, banded by Donald W. Gillingham, on Zone Island, Fraser River Delta, British Columbia, on September 30, 1923, was killed on Westham Island, at the mouth of the Fraser River, twenty-one miles south of Vancouver, British Columbia, on October 1, 1913.

PINTAIL, No. 201,317, young male, banded by Donald W. Gillingham, on Zone Island, Fraser River Delta, British Columbia, on September 30, 1923, was shot at Vancouver, British Columbia—no date given, but reported on October 1, 1923.

PINTAIL, No. 201,325, young male, banded by Donald W. Gillingham, on Zone Island, Fraser River Delta, British Columbia, on September 30, 1923, was shot on the delta of the Fraser River, British Columbia, on October 1, 1923.

PINTAIL, No. 297,361, banded by H. S. Osler, at Lake Scugog, Ontario, on October 5, 1923, was shot on Lake St. Clair, Ontario, on November 1, 1923.

PINTAIL, No. 297,362, banded by H. S. Osler, at Lake Scugog, Ontario, on October 5, 1923, was shot at Cayuga Lake, New York, on November 21, 1923.

CANADA GOOSE, No. 237,947, banded by I. S. Adams, at La Batture aux Loups Marins, opposite L'Islet, Quebec, on October 20, 1923, was shot in the same vicinity, on October 27, 1923.

FLORIDA GALLINULE, No. 296,121, banded by H. S. Osler, at Lake Scugog, Ontario, on September 14, 1923, was captured at a place six miles from Mayo, Florida, on November 1, 1923.

PHEASANT, No. 224,336, male, banded by G. D. Sprot, at Mill Bay, Vancouver Island, British Columbia, on December 20, 1923, repeated at the same station on February 22, 1924, and was shot at a place between Shawinigan Lake and Mill Bay, British Columbia, on November 10, 1924.

CALIFORNIA PARTRIDGE, No. 113,300, banded by J. A. Munro, at Cedar Hill, Vancouver

Island, British Columbia, on September 26, 1923, was found dead at a place three-quarters of a mile from where it was banded, on or about February 10, 1924.

BLUE JAY, No. 18,623, banded by K. Grant McDougal, at East Kildonan, Manitoba, on December 30, 1923, was found dead at a place about one mile from the banding station, on February 28, 1924. The body of the bird was partly eaten, probably by an owl or a cat.

STELLER'S JAY, No. 260,901, juvenile female, banded by G. D. Sprot, at Mill Bay, Vancouver Island, British Columbia, on September 26, 1923, repeated at the same station until November 20, 1923, and was killed in a rat trap in the same vicinity, on September 12, 1924.

STELLER'S JAY, No. 48,026, banded by G. D. Sprot, at Mill Bay, Vancouver Island, British Columbia, on October 25, 1923, repeated at the same station on November 4, 1923.

MEADOWLARK, No. 216,959, banded by Reuben Lloyd, at Davidson, Saskatchewan, on September 22, 1923, caught its toe in a barb wire fence and wound itself around until it broke its leg near the joint. The lower part of its leg was taken off. It was found dead about one hundred yards from the Banding Station, on May 5, 1924. It probably died during the fall of 1923.

HARRIS'S SPARROW, No. 26,461, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, repeated at the same station on September 19 and 20, 1923.

HARRIS'S SPARROW, No. 26,467, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, repeated several times at the same station until September 24, 1923.

HARRIS'S SPARROW, No. 26,469, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, was recaptured at the same station on September 20, 1923.

HARRIS'S SPARROW, No. 28,166, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, repeated at the same station until September 21, 1923.

HARRIS'S SPARROW, No. 28,168, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, was recaptured at the same station on September 19, 1923.

HARRIS'S SPARROW, No. 28,171, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, repeated several times at the same station until September 24, 1923.

HARRIS'S SPARROW, No. 28,172, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, repeated several times at the same station until September 19, 1923.

HARRIS'S SPARROW, No. 26,481, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 18, 1923, repeated at the same station until September 22, 1923.

HARRIS'S SPARROW, No. 26,490, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 21, 1923, repeated at the same station until September 25, 1923.

HARRIS'S SPARROW, No. 26,491, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 21, 1923, was recaptured at the same station on October 1, 1923.

HARRIS'S SPARROW, No. 26,492, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 21, 1923, was recaptured at the same station on September 25, 1923.

HARRIS'S SPARROW, No. 26,493, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 22, 1923, repeated several times at the same station until October 3, 1923.

WHITE-THROATED SPARROW, No. 28,160, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 9, 1923, repeated at the same station on September 11 and 18, 1923.

WHITE-THROATED SPARROW, No. 28,162, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 10, 1923, repeated several times at the same station until September 26, 1923.

WHITE-THROATED SPARROW, No. 28,164, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 10, 1923, repeated several times at the same station until September 14, 1923.

WHITE-THROATED SPARROW, No. 28,163, immature, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 10, 1923, repeated several times at the same station until September 24, 1923, when it was caught by a stray cat and wounded beyond recovery.

WHITE-THROATED SPARROW, No. 76,011, banded by K. Grant McDougal, at East Kildonan, Manitoba, on September 17, 1923, repeated at the same station until September 22, 1923, when it was killed by a marauder.

WHITE-THROATED SPARROW, No. 26,465, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, was recaptured at the same station on September 18, 1923.

WHITE-THROATED SPARROW, No. 26,466, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, repeated at the same station on September 19 and 21, 1923.

WHITE-THROATED SPARROW, No. 28,167, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, repeated at the same station until September 20, 1923.

WHITE-THROATED SPARROW, No. 28,170, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, was recaptured at the same station on September 18, 1923.

WHITE-THROATED SPARROW, No. 28,174, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 17, 1923, was recaptured at the same station on September 18, 1923.

WHITE-THROATED SPARROW, No. 26,473, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 18, 1923, repeated at the same station until September 22, 1923.

WHITE-THROATED SPARROW, No. 26,478, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 18, 1923, repeated at the same station until September 28, 1923.

WHITE-THROATED SPARROW, No. 26,479, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 18, 1923, was recaptured at the same station on September 19, 1923.

WHITE-THROATED SPARROW, No. 26,494, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 22, 1923, was recaptured at the same station on September 23, 1923.

WHITE-THROATED SPARROW, No. 26,496, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 22, 1923, was recaptured at the same station on September 24, 1923.

WHITE-THROATED SPARROW, No. 26,497, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 22, 1923, was recaptured at the same station on September 24, 1923.

WHITE-THROATED SPARROW, No. 62,778, immature, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 27, 1923, repeated several times at the same station until October 12, 1923, when it was found dead in the same vicinity.

WHITE-THROATED SPARROW, No. 62,783, immature, banded by Eric Kiteley, at Winnipeg, Manitoba, on September 29, 1923, repeated several times at the same station until October 19, 1923, when it was found dead in the same vicinity.

WHITE-THROATED SPARROW, No. 42,767, banded by R. Lloyd, at Davidson, Saskatchewan, on October 1, 1923, was recaptured at a point two hundred yards from where it was banded, on October 13, 1923.

WHITE-THROATED SPARROW, No. 42,755, banded by R. Lloyd, at Davidson, Saskatchewan, on October 2, 1923, repeated at the same station on October 6, 1923.

JUNCO, No. 33,743, banded by J. A. Munro, at Colquitz, Vancouver Island, British Columbia, on November 15, 1923, was recaptured at the same station on November 18, 1923.

JUNCO, No. 33,749, banded by J. A. Munro, at Colquitz, Vancouver Island, British Columbia, on November 18, 1923, was killed in a pole-trap in the same vicinity, on January 14, 1924.

SLATE-COLOURED JUNCO, No. 56,792, banded by R. W. Tufts, at Wolfville, Nova Scotia, on September 10, 1923, was recaptured in the same trap on September 12, 1923.

SLATE-COLOURED JUNCO, No. 59,529, banded by K. Grant McDougal, at East Kildonan, Manitoba, on October 4, 1923, was recaptured at the same station on October 6, 1923.

FOX SPARROW, No. 28,143, banded by K. Grant McDougal, at East Kildonan, Manitoba, on October 4, 1923, was recaptured at the same station on October 12, 1923.

FOX SPARROW, No. 28,145, banded by K. Grant McDougal, at East Kildonan, Manitoba, on October 12, 1923, was recaptured at the same station on October 14, 1923.

CATBIRD, No. 28,141, banded by K. Grant McDougal, at East Kildonan, Manitoba, on September 11, 1923, was recaptured at the same station on September 13, 1923.

BROWN THRASHER, No. 18,618, banded by K. Grant McDougal, at East Kildonan, Manitoba, on September 9, 1923, repeated twice at the same station on September 12, 1923.

(Continued in the September issue)



BOOK REVIEW

THE AUK—JULY

THE POLYNESIAN FRUIT PIGEON, *Globicera pacifica*, ITS FOOD AND DIGESTIVE APPARATUS. By Casey Wood, pp. 433-438, 1 figure.

An anatomical description of the stomach of the "Nutmeg Pigeon". The stomach is not strongly muscular and in place of the usual hard grinding plates that most birds use to reduce hard seeds to pulp, on the inner lining are several rows of horny cone-like processes. It is explained that it is not the nutmeg seed itself that is digested but the softer outer pulp that surrounds the fruit.

IS PHOTOPERIODISM A FACTOR IN THE MIGRATION OF BIRDS? By G. Eifrig, pp. 439-444.

Citing cases where experiment has shown that prolonged illumination has brought plants into bloom long before their season. Mr. Eifrig suggests that the varying length of day may be the direct factor that starts birds migrating. It is not an altogether new thought. Birds do migrate more or less by the calendar. Though bad weather may delay their movements their arrivals and departures are far more constant than seasonal conditions. There must be something to keep the migrating instincts in tune with the seasons. That length of daylight, the proportion of active feeding hours to those of sleep or rest, may be a factor in this is quite probable. However it does not explain all, for one thing, birds wintering near the equator where day and night are equal throughout the year. There is an investigation being carried out in Canada now along these lines and it would be rash to develop or criticise the theory until the results are reported.

THE SONG OF THE SONG SPARROW (A SYSTEMATIC STUDY OF ITS CONSTRUCTION). By Wm. C. Wheeler and John T. Nichols.

An interesting paper wherein is also presented another method of graphically representing and recording songs that has promise for the musically untrained.

Under *General Notes*, Page 470, A. L. Gormley reports the capture of a Fulmar near Arnprior, Ontario, May 3, 1924. Not only is this the first record for Ontario but it seems to be the first noted occurrence of the species anywhere away from the immediate vicinity of the sea.

Mary Sayle, p. 474-475, fed apple, grape, strawberry and cherry seeds to pigeons and found that none passed the alimentary tract in condition to germinate.

O. J. Murie, p. 481, reports Clarke's Nutcracker in the Kuskokwim River and the Fairbanks regions,

Alaska, thus extending its known range considerably.

On P. 501 is noted—*With Canoe and Camera on Some Alberta Lakes*, by D. A. Henderson, Oologist, XLI, February, 1924.

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FURTHER NOTES AND OBSERVATIONS ON THE BIRDS OF HATLEY, STANSTEAD COUNTY, QUEBEC. By Henry Mousley, pp. 572-589.

This consists of seasonal and specific notes on this locality that Mr. Mousley has studied so intensively. He adds twelve species to his previous lists.

NINTH ANNUAL LIST OF PROPOSED CHANGES IN THE A.O.U. CHECK-LIST OF NORTH AMERICAN BIRDS. By Harry C. Oberholser, pp. 590-595.

These lists of proposed alterations are of great value to all interested in systematic ornithology as proposals from widely scattered sources many of them unavailable to most readers are here brought together.

NOTES ON THE PURPLE FINCH. By M. J. Magee, pp. 606-610.

Some valuable results of banding these birds at Sault Ste. Marie, Michigan, during the years 1922-1924, with special relation to the changes of plumage with age. He shows no grounds for the more or less generally accepted theory that males revert from the adult crimson plumage into a yellow or olive one. He believes that it takes at least four years for the highest crimson plumage to be assumed. He seems to have special opportunity for banding Purple Finches and gets numerous annual returns. It will be interesting to see what definite facts the next few years will produce. The puzzling plumages of the Cross-bills could well be untangled by this method.

Henry Howitt, pp. 614, announced a sight record of the Golden-winged Warbler at Guelph, Ontario, May 31, 1924. The species is not uncommon in the southern part of the province along Lake Erie, and there is nothing improbable in its occurrence at Guelph.

Harrison F. Lewis, p. 617, takes exception to the statement that "Omshel" is the only commonly used vernacular synonym for Robin, as held by a recent writer, stating that to more than 2,450,000 French Canadians the name "Merle" is in common usage.

W.L.M. (c Atee) reviews the subject of the relation between birds and the spread of Foot and Mouth disease and cites Stockman, S., and Mar-

jory Barnett, Bird Migration and the Introduction of Foot and Mouth Disease, Journ. Ministry Agr. (London), 30, No. 8, 1923, pp. 681-695 and a critique of the same by A. Landsborough Thompson, Bird Migration in Relation of Foot and Mouth Disease. The latter author does not think that the conclusions of the former that birds are an important factor in the spread of this disease are justified by the evidence presented. W.L.M. quite agrees with him and cites examples of hysteria on this continent and states that of some 35,556 infected herds, birds were suspected of being carriers in but 18 cases. He admits the possibility, even the probability of birds spreading the disease in some cases, but the ordinary observational evidence is very unreliable and adequate investigation is needed to determine how serious a factor they are.

The same reviewer quotes, p. 630, A. B. Baird, Proc. Acadian Ent. Soc., 8, p. 162, 1923, who credits birds with consuming about 10 per cent of the Larch Sawfly in New Brunswick.

Pp. 639-641, under *Correspondence*, is a letter from A. Landsborough Thompson commenting on Mr. Eifrig's *Is Protoperiodism a Factor in Bird-migration?* before referred to in these pages. He is generally favorable to that article but urges caution in reasoning by analogy from plants to birds and raises some objections.

Pp. 643-644 contain an obituary to Montague Chamberlain whose death was noted in a previous number of *The Naturalist*.

On P. 648 occurs an editorial on the DuPont de Nemours Powder Companies campaign against the Crow. The condemnatory attitude is strong. Generalizations are made that may have local point but certainly do not apply to very large areas of this country. For instance, it is stated that "Crows are not so numerous now as formerly nor are they doing so much harm . . ." We have correspondence showing that in the prairie Provinces, from thirty to fifty years ago, the Crow was practically unknown, or at least so few in numbers that they made no impression on the perceptions or memories of ordinary observers. To-day they occur in black hordes and certainly this newly arrived superabundance does constitute a serious menace to game birds. If the Crow averages, as a species, over the whole of its range, agriculturally neutral, which is the strongest argument that is advanced in its favor, its status now and in this section is well on the unfavorable side. As to the feared *extermination* of the species—that is too improbable for consideration. That the

campaign against the Crow does sell some ammunition for the powder company is no logical argument against the effort if the results are otherwise good. We personally think the Crow is a geographical problem and that those critics who fail to recognize that fact are as much at fault as the DuPont people, who fall into the same error. No better method of discrediting scientific authority can be conceived than for it to make broad generalizations that are false within the experience of a large number of lay observers. It is the old dispute of the description of the two sides of the shield but the scientific mind should be the first to investigate the other side before dogmatizing.

It must be noted that the above remarks apply only to the Crow, not to any allied campaign against other species like hawks, herons, etc. These latter may also have varying geographical status, but lie in an entirely different category. We think conservationists weaken the case for conservation when they concentrate their heavy guns in defence of so questionable an object as the Crow.—P. A. T.

SOME OTHER PUBLICATIONS

Birds and Wild Animals.—List of publications relating to the above subjects for sale by Superintendent of Documents, Washington, D.C. Price list 29—11th edition. A handy compendium of papers in print on the above subjects embodying the economic investigations of the United States Government. The prices range from 5 cents to \$1.50 and are little more than nominal.

In *The Oologists' Record*, London, V, March, 1925, pp. 16-17, is a letter from T. E. Randall, Castor, Alta., recounting two peculiar nesting sites. In one case a nest in North-east Kent, England, was used for two clutches of Magpie eggs, two of Kestrel and finally one of Stock Dove, all in the same season. The other is that of a House Wren building in the pocket of a coat hanging on the wall of a boat house at Gull Lake, Alta.

In *Natural History*, XXV, 1925, pp. 54-57, appears *A Trickster Outwitted*, by Chas. Macnamara. Describing how the Yellow Warbler outwitted the Cowbird by building the changeling egg into the foundation of its nest and raising its own brood in a new cup above. It is written in Mr. Macnamara's usual charming manner. The only thing that we object to is the statement that the Cowbird never lays more than one egg in the same nest. Many of us can recall numerous cases where they have exceeded this limit.—P. A. T.



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SEPTEMBER, 1925



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VOL. XXXIX

OTTAWA, ONTARIO, SEPTEMBER, 1925

No. 6

FIELD STUDIES OF GROWTH FORMS OF SOME OF THE NATIVE TREES OF THE ENVIRONMENT OF VICTORIA, B.C.

By C. C. PEMBERTON,
Victoria, B.C.

TWINING FIRS

A remarkable habit has lately appeared in the fir trees of the districts surrounding Victoria, B.C. It consists of a twining movement whereby the stem of one fir winds around that of another in the manner of an ordinary twiner. Several instances of this nature have been observed both in Douglas fir (*Pseudotsuga taxifolia* [Poir] Britt.) and Grand fir (*Abies grandis*, Lindley).

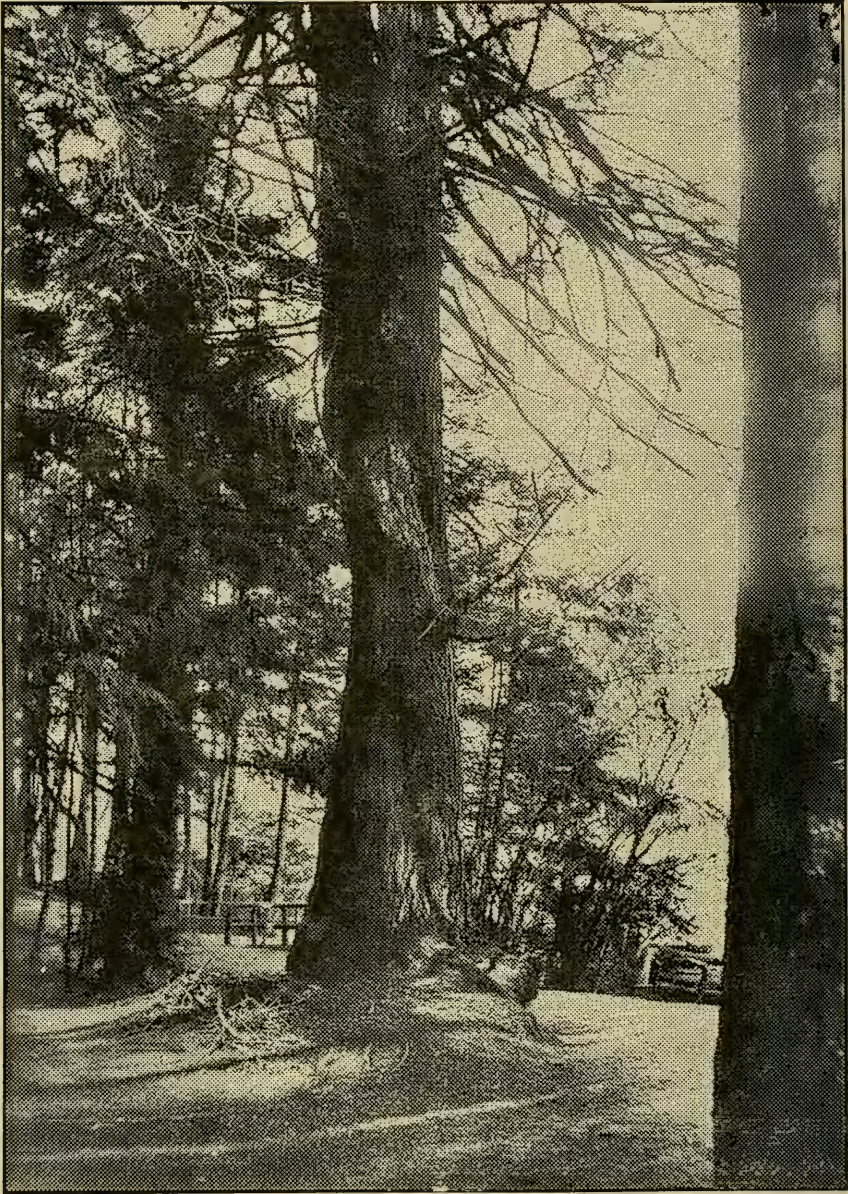
FIGURE NO. 1. I obtained the photograph of the two firs shown in this figure many years ago when I first endeavoured to assemble photographic studies of the growth forms of our native trees. At that time I saw no other instance of anything approaching a twining movement in any of the coniferous trees of this neighbourhood.

FIGURE NO. 2.—Some months ago, however, Mr. L. A. Breun drew the attention of the Natural History Society of British Columbia to a curious instance of apparent twining in a small Douglas fir tree close to the excavation for the new Dry Dock now nearing completion at Esquimalt. Here a slender Douglas fir had bent sharply over to the right and gradually circled upward around the stem of a larger Douglas fir which had been growing close to it. After completing the circle the rotating movement continued at a much sharper curve for about three quarters of the distance around the trunk of the larger tree and the twiner then assumed vertical growth. In this specimen the encircling movement, though on a large scale, is much more like an ordinary twiner than in the grand firs shown in Figure No. 1, and I felt convinced that it was a genuine instance of twining. Since the excavation operations for the dock have commenced, the two firs have died.

FIGURE NO. 3. Being fully satisfied that both the instances depicted in Figure No. 1 and Figure No. 2 were actual cases where a twining movement had taken place, I sought for other evidences of the phenomenon. Not far from the dock I found the specimen shown in Figure No. 3, in which, although the twining movement is present, it is not very pronounced. A young Grand fir appar-

ently had made a partial twine to the left around the stem of a larger tree, which in this case was a Douglas fir. The top of the twiner was evidently soon killed by the excessive shade from the more sturdy Douglas fir and at first it seemed as if the whole tree had been killed. Quite recently, however, a young lateral branch which apparently is of adventitious origin has sprung from the lower part of the twiner and is thriving. This seems to prove that the lower portion of the twining tree which is now exposed to lateral illumination has remained vital and this retention of vitality may be due to root graft with a large foliage possessing Grand fir which is situated to the right hand of the picture. The adventitious branch is quite small and does not show in the illustration.

FIGURE NO. 4 In the same neighbourhood I also observed another example of a partial twining movement in Grand fir trees. This is depicted in Figure No. 4, and has several peculiar features. The twiner and its support have apparently a common base and seem originally to have formed one tree. The twiner first takes a slight turn to the right. Afterwards it swings over to the left and evidently in its effort to effect a twining movement it pressed against the trunk of the larger tree so tightly that graftage ensued. From this point a ridge running up the stem of the larger tree seems to indicate that the leader of the twiner must have grown vertically along the stem of the support and, becoming grafted as it proceeded, was finally enveloped by the girth increment of the larger tree. Then, at the point where the graftage started, another leader, which may be either an adventitious shoot or a substitute branch leader, had apparently endeavoured to continue to twine. The shade from the forest seems to have killed this new leader for it is now dead and decadent as far down as the point of graftage where it commenced. The stem of the original twiner, however, remains vital below this graft down to where it springs from the base. There is also a stub of another stem which evidently once grew out from the common base but was subsequently cut off. The stub, however, remains vital and is in process of



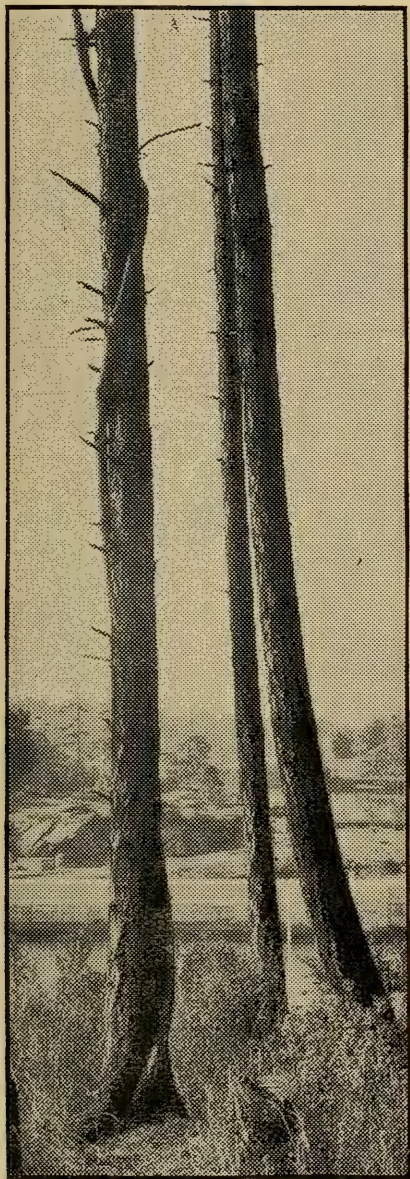
TWINING FIRS

FIGURE NO. 1.—*Grand fir*. Abies Grandis, Lindley. Twine to the left by one Grand fir around another tree of the same species. The "Gorge Park", Victoria, B.C.

being healed over by a callus formation from the parent tree. The explanation of the multiple leader formation may be that it is a case where the leader of the young fir was destroyed and the lower branches all tried to become substitute leaders. (See *The Canadian Field Naturalist*, Vol. XXXIX, No. 5, Fig 5, p. 99, Fig 6, p. 100.) One of them may have dominated and now form the trunk around which the twiner has

tried to circle. The twiner, in that case, would be one of the competing branches which, being out-distanced in the vertical race, resorted to twining. The stub probably belonged to another competing branch which was also being left behind in the vertical race at the time it was cut away.

FIGURE 5 AND FIGURE 5a. In the woodland portion of the new Inter-Municipal Burial Park at Royal Oak, in the Saanich Municipality, I have



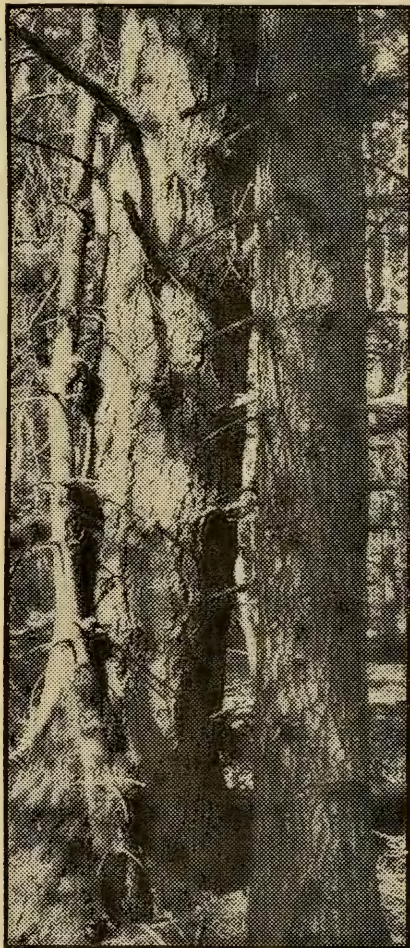
TWINING FIRS

FIGURE NO. 2.—*Douglas fir*, *Pseudotsuga taxifolia* (Poir) Britt. Remarkable twine to the right by a small Douglas fir round the trunk of a larger tree of the same species. Dry Dock, Esquimalt, B.C.

recently seen two more specimens of Douglas fir showing a twining characteristic. One of these is shown in Figures Nos. 5 and 5a. Figure No. 5 represents the trees as seen when looking to the eastward. In this the twiner starts on the left. It grows vertically for a short distance. Then it takes a sharp turn to the right and winds tightly

around the stem of the supporting fir to which it has grafted and is now nearly enveloped by the girth increment of the latter. In fact, only a faint trace of the stem of the twiner can be discerned. Figure No. 5a illustrates the trees as seen looking to the westward and shows on the left the point where the twiner has completed its twine and has emerged from the graftage and then resumed the more vertical direction. This view also shows, on the right, the vertical part of the stem of the twiner before it made its twining movement and became grafted to the stem of the support, as seen in Figure No. 5.

FIGURE NO. 6. The two trees seen in this figure are two young Douglas firs which twine loosely to the left around each other. They



TWINING FIRS

FIGURE NO. 3.—*Grand fir*, *Abies grandis*, Lindley. Partial twine to the left by a small Grand fir around a larger Douglas fir. Esquimalt, B.C.

form the second of two instances which I found in the Royal Oak Burial Park, and to my mind do not appear to have originally been two separate



TWINING FIRS

FIGURE NO. 4.—*Grand fir*, *Abies grandis*, Lindley. Partial twine to right and then to left and graftage. Esquimalt, B.C.



TWINING FIRS

FIGURE NO. 5.—*Douglas fir*, *Pseudotsuga taxifolia* (Poir) Britt. Twiner, (left) grows vertically at first, then twines to right and intergrafts with larger tree of same species. Inter-Municipal Burial Park, Saanich, B.C.

individual trees, but, on the contrary, have every appearance of being two substitute branch-leaders of a young fir which had lost its primary leader.

Mr. Alfred Carmichael has recently pointed out two more cases of twining firs. Both are grand fir.

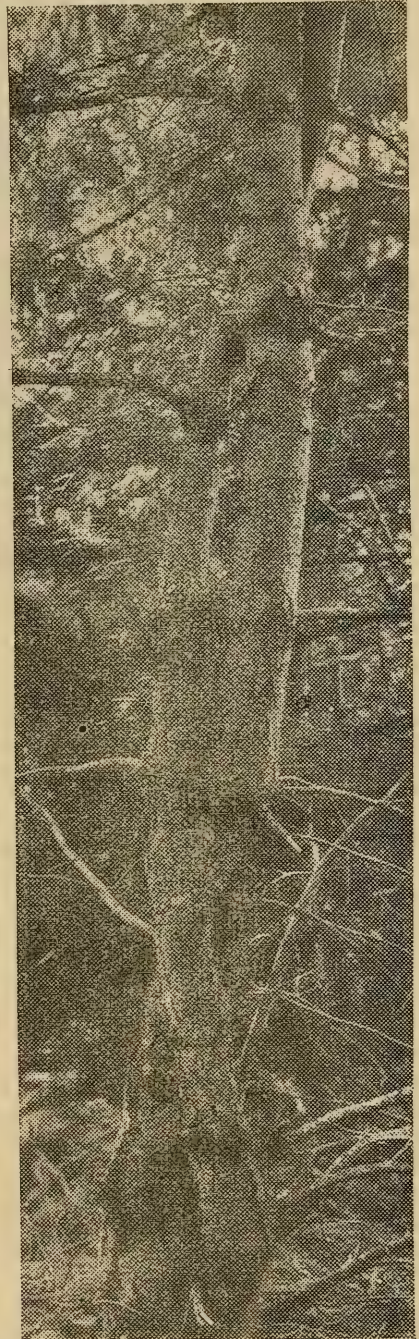


TWINING FIRS

FIGURE No. 5a.—View of trees in Figure No. 5 from opposite direction. Shows end of twine and graft and resumption of vertical growth by twiner.

One is situated on the West Sooke road near the Kangaroo cross-road and consists of a fairly large Grand fir which has twined to the right around the stem of a larger Douglas fir. The Douglas fir has, however, recently died. In this instance the stem of the twiner flattens out against

the stem of the Douglas fir, near the tops of the two trees, and then ends in a lateral, branch-like



TWINING FIRS

FIGURE No. 6.—Douglas fir, *Pseudotsuga taxifolia* (Poir) Britt. Two young Douglas fir trees twine loosely to the right. Inter-Municipal Burial Park. Saanich, B.C.



POSITIVE GEOTROPISM OF SHOOTS INDUCED BY PARASITIC DISTURBANCES

FIGURE NO. 7.—Lateral branch, or secondary axis of Grand fir (*Abies grandis*, Lindley) showing positive geotropism in adventitious shoots of "Witches' Broom". This branch was cut down in order to obtain the picture.

growth. The other instance pointed out by Mr. Carmichael is on the Happy Valley road, near its junction with the East Sooke road, and is a case of one Grand fir making a pronounced twining movement to the right around the stem of a nearby tree of the same species. Mr. A. H. Maynard has also shown me photographs of natural graftage of stems of Grand fir saplings on his property on West Saanich road, in which the graftage seems to be the result of a twining movement. I have not had opportunity to study these latter growths.

The governing influence guiding the movement of twining plants seems to be conceded to be diageotropism. Why some types of plants make sinistrorse and others dextrorse twines, and others again twine in either direction, or even (in a few species) change their direction of twine, is apparently as yet unknown.

In *The Boys' Own Annual* for 1903, at page 51, there is an article, "TWINING PLANTS—Why Do Beans and Hops Climb Differently?" by Mr. Eric R. Collier, in which he says:

"Now the shoot of a plant growing in the northern hemisphere, following the apparent course of the sun, would face East in the early morning, South at noon, and West in the evening. Thus it would travel in a clock-wise direction. On the other hand, a plant growing in the southern hemisphere, and following the direction of the sun's apparent motion, would

face successively, East, North and West, thus rotating in an anti-clockwise direction. If the history of these twining plants is traced back to their original habitat, it is found that the hop, clematis, pea, nasturtium, vine, honeysuckle and nightshade were all originally found growing somewhere in the northern hemisphere . . . Also all these plants twine in a clockwise direction . . . On the other hand, however, it is found that the bean, convolvulus, fuschia, asparagus and white bryony all had their original habitat in countries situated in the southern hemisphere, and were imported into Europe at various times during the last few hundred years . . . Moreover, all these plants twine in an anticlockwise direction, corresponding to the anti-clockwise direction of the sun's apparent motion in the southern hemisphere.

"Finally, the question arises: 'Why have not these plants changed their direction of rotation, to accommodate their growth to the direction of the sun's motion in the hemisphere in which they are growing?'

"The answer to this question lies in the fact that the plant is obeying a vestigial instinct which it has not yet lost. The process of evolution, though sure, is exceedingly slow, and no doubt, at some distant period in the world's future, these twining plants will finally lose this instinct in the same way that man will probably lose vestigial remains such as the vermiform appendix and the os coccyx."

The stems of firs do not ordinarily require to be supported. Both Douglas and Grand fir belong to the Northern hemisphere and the specimens so

far observed indicate that in each species trees may twine either to the right or left. Mr. Collier's explanation, therefore, would not in these particulars apply to twining firs.

On the other hand, the twining movement seems to have taken one or more seasons to accomplish. It looks like the heliotropic curvature of the arbutus (See *The Canadian Field-Naturalist*, Vol. XXXVI, Fig. 2, p. 22), but in a continuous circular manner, therefore, the resumption of the vertical direction after the twiner has reached a certain height may mean that the twining in the early stages had been occasioned by an endeavour to reach light but that the attainment of this object enabled the tree to obey its normal negative geotropism.

In my experience the primary axis of sapling Grand fir may in light contests show positive heliotropic reaction to lateral illumination and at the same time assume the dorsi-ventrality of symmetry of a lateral branch. In Douglas fir, on the other hand, the negative geotropism of the primary axis is most imperative and in contests for overhead light the orthotropic shoot may become aborted and then a lateral branch generally re-establishes the vertical lead and radial symmetry of a primary axis. I have not examined the root systems of the twining firs to see whether root graft exists between the twiner and its support where they are of the same species, or whether root graft is in any way incident to the phenomenon of twining.

It is well known that many conifers possess the power of supplying wood-forming material by means of root graft to the stumps of other trees, of the same species, which have been felled. It also seems that the assimilated sap can be passed on, by secondary root graft, to other more remote stumps. (See *The Canadian Field-Naturalist*, Vol. XXXV, No. 5, Figs. 3, p. 85 and 4, p. 86. Fig. 3, however, is in an inverted position). In these cases the food material comes down the stem of the foster tree, along its roots, through the graft and up the stems of the stumps of the felled trees. On these it can form a capping which is said to have amounted, in one instance, to two hundred rings. I submit that it is conceivable that a young fir, losing canopy display through crowding, may obtain nourishment from the tree to which it is root grafted, and this food material, being from the base or roots of another tree, may in some way induce a twining movement which lasts until the twiner regains full canopy.

I note that in *A Textbook of Botany* (John Merle Coulter, Ph.D., Charles Reid Barnes, Ph.D., and Henry Chandler Cowles, Ph.D., American Book Company, New York. Vol. II, Page 656, Foot Note No. 1), the authors say:

"Recently, evidence of the inception of a twining habit has been discovered in a race of snapdragons, (*Antirrhinum Majus*), the new form appearing to be a mutant. This form has the characteristic anatomical features of twiners, such as a small pith region, compact vascular tissues, and cortical differences on the convex and concave surfaces.

"Furthermore, the twining variants, however caused, come true to seed. It is difficult to see much advantage in the changed habit, since the new forms are quite as erect and strong as ordinary individuals, and coils often occur in positions where they scarcely can be of use, as at the base of a shoot."

POSITIVE GEOTROPISM IN SHOOTS OF "WITCHES' BROOM"

The adventitious shoots of the "Witches' Broom" shown in Figure No. 7 have sprung from the lower side of a lateral branch of Grand fir (*Abies grandis*, Lindley) and are positively geotropic in direction of growth, as if they were roots.

This is contrary to the ordinary rule in fir, viz: that the primary axes of shoots are essentially apogeotropic. The presence of the fungoid parasite, therefore, has in this instance evidently upset the normal correlations and reactions of an autophytic plant. There seems, however, to have been a slight tendency to heliotropic curving toward the lateral light. I believe that in their lack of geotropic reaction the shoots of this "Witches' Broom" are like partial parasites, such as mistletoe, etc., which, in direction of growth react toward any body on which they germinate in the same manner as the autophyte normally reacts in relation to the earth.

I note the interesting accounts of early experiments in respect to mistletoe, etc., given by Dr. Lindley (*An Introduction to Botany*, third edition, Longman, Orme, Brown, Green and Longman's, London, 1839, pp. 408-409). Although Knight's opinion is quoted by Lindley (p. 406) I am unaware whether his experiments with the *Klinostat* had at that time been made.

I have not had opportunity of following up the later research in connection with the subject of geotropic reaction in parasites and partial parasites.



THE ACCLIMATIZATION OF THE FOX SQUIRREL AT PEELEE ISLAND, ONTARIO

By HOYES LLOYD

IN NOVEMBER, 1922, I paid a visit to Point Pelee National Park, and while journeying westward called upon both Mr. J. H. Fleming, at Toronto, and Mr. W. E. Saunders, at London. Mr. Fleming called my attention to the fact that the Fox Squirrel, *Sciurus niger* subsp? occurred on Pelee Island, which was of interest, as this is apparently the only spot where it is found in Canada. The fact of this species being found at Pelee Island was also discussed with Mr. Saunders. In the course of my visit to Point Pelee the question of Fox Squirrels was naturally discussed with the Superintendent, Mr. F. H. Conover, who has long taken an interest in the wild creatures of his neighbourhood. From memory, Mr. Conover at once volunteered the information that the Fox Squirrel had been introduced on the island many years ago, and he kindly agreed to secure any details that might be available at this late date concerning the introduction. These came to me by letter of January 24, 1923, from which I shall quote:

"Dear Mr. Lloyd:—I have been casting about for a considerable time endeavouring to obtain definite information in respect to the 'Fox Squirrels' that some thirty years ago were first introduced upon Pelee Island by Mr. Charles Mills, of Sandusky, Ohio, U.S.

"The definite date cannot so far be given, only approximate.

"I am still at work seeking further information in this connection.

"Mr. Mills has since died, and as these squirrels were transferred by the American Fishing Club, the older members have passed out. If I can obtain anything I certainly will do so with pleasure.—F. H. Conover."

This information was supplemented later by a statement that Mr. Mills brought these squirrels from southern Ohio, near the Kentucky border. After being brought to Pelee Island, they soon became plentiful, but dwindled later to such an extent that Mr. Conover doubted if one could be found by January, 1925. He has a specimen taken at Pelee Island about eight years ago by a hunter. Mr. Saunders saw none on his last visit to the island, and comments on this as remarkable—the time being midsummer.

Having survived in this new environment, which is undoubtedly almost identical with that from which it came, for such a long time, it must be considered that the Fox Squirrel became thoroughly acclimated, although apparently it was depleted by hunting later. It is to prevent the fact of its introduction being forgotten, and to protect future naturalists from thinking the species indigenous, should it persist, that these few lines have been written.

FURTHER NOTES ON CANADIAN FRESHWATER ISOPODS AND AMPHIPODS

By FRITS JOHANSEN

IN SEPTEMBER, 1923, I received from Prof. C. H. O'Donoghue, of the University of Manitoba, Winnipeg, some vials containing freshwater Crustaceans, which he had collected, in the end of May, 1923, in a pond named "Hydra Lake", situated at about 400 feet elevation, on the hill above Horswell Bluff, about 1½ miles north of Departure Bay, on the east side of Vancouver Island. Among these crustaceans (Copepods, Cladocera, etc.) were a dozen specimens (half-grown and adults) of the common, freshwater Amphipod, *Hyalella azteka* (Saus.). This is apparently the first record of this species from Vancouver Island; but I have already recorded it from the mainland part of British Columbia (*Canadian Field-Naturalist* for October, 1920, p. 131). I have recently seen specimens of this species, sent from the vicinity of Halifax, to the Department of Marine and Fisheries, Ottawa, which seems to be the first definite record of *H.*

azteka from the part of Nova Scotia lying south of the Strait of Canso.

On August 3rd, 1924, I collected a number of adults (both sexes) and newborn young of the same species (*H. azteka*) among algae and stones in the bights below the old wharf on the Ontario side, at Deschenes Rapids, Britannia; and two weeks later I found a great many newborn and half-grown young of the same Amphipod, among Utricularia-plants in Black River, on the east side of Lake Simcoe, Ontario.

So late as October 19th, 1924, I found both the Isopod, *Asellus communis* and the Amphipod *Eucrangonyx gracilis*, exceedingly common among dead leaves and aquatic vegetation in the pond in Major Hill Park, Ottawa, Ont. The Isopods had a length of from ½ to 1½ cm., and showed their usual sluggish behaviour; it is perhaps worth mentioning here, that their latin, generic name (*Asellus*) means "the little ass", and refers to the

coloration of those isopods, greyish above and whitish below.

The Amphipods (*E. gracilis*) were represented by new-born (1 mm. long), half-grown young, and adults, the females carrying dark-blue eggs. The young, particularly the new-born ones, were pale (whitish), with the orange, intestinal tract shining through; in the older ones the margin of the body segments (somites) had the strongest (darkest) coloration.

This new record of *E. gracilis* proves that in the vicinity of Ottawa, there are at least three broods during the summer and fall, as I have suggested in *The Canadian Field-Naturalist* for October, 1920, p. 129, the time in the autumn, however, being in October, not in September. Future investigations may show that these new broods are still more frequent, during each season of about seven months (April-October inclusive).

From the records of *Asellus communis* around Ottawa (see *Canadian Field-Naturalist* for November, 1920, pp. 147-48), it would seem that the broods are less frequent, and the growth slower, than in *E. gracilis* and other freshwater Amphipods, perhaps owing to the more vegetarian diet

of the Isopods. In lakes and rivers, which do not freeze to the bottom during the winter, both the Isopods and Amphipods probably occur all year round, and their broods are therefore more numerous than in more shallow water.

NOTE—Since this was written, and sent in for publication, I have received from Dr. S. C. Ells, of the Department of Mines, Ottawa, ten adult *Gammarus linnaeus*, including some females with eggs, collected by him in McClelland Lake, about sixty miles north of Fort McMurray, Alta., in the Athabasca River country, about lat. 57 degrees north, in June, 1924.

Dr. Ells kindly informs me that this lake, which is in township 98, range 8, west of the 4th meridian, is in size about 6 by 3 miles, at an elevation of about 900 feet, with an outlet to Athabasca River. These "shrimps" are considered a pest in the lake, as they devour all bait on fish-hooks, and clog the lines set there. The only commercial fish in this lake are pike (and perhaps pickerel).

This new record of *G. linnaeus* is valuable; for it shows that the species is as common in the sub-arctic parts of western Canada as further north and south.

My identification of these specimens has been kindly verified by Mr. C. R. Shoemaker, of the U.S.N.M., Washington, D.C.—F.J.

THE SPIDER COLLECTIONS OF F. W. WAUGH

By J. H. EMERTON

IN THE course of his studies of the language and customs of the Indians, which took him on long visits to out-of-the-way parts of Canada, Mr. Waugh was accustomed to observe and collect spiders, and so became well acquainted with the common kinds and discovered many facts of value relating to the distribution of these animals in North America.

In 1916 he visited Nipigon, Long Lake and Manitoulin Island, where he found the then little known *Linyphia nearctica*, *Linyphia limitanea* and *Theridion zelotypum* near their southern limits in the Great Lakes region. In the following year he collected around Winnipeg and there found *Pardosa greenlandica*, its most southern station except in the mountains.

In 1918 he spent the summer at the Six Nations' Reservation, near Brantford, Ontario, where he collected largely and found several southern species near their northern limits in Canada, the two species of *Argiope*, *Epeira hortorum*, *Hytia bina* and *Epeira insularis*.

In 1919 he had a long season at Lac Seul, Ontario, where he collected from June to September and made a typical Middle Canadian collection of fifty species, including the western *Lycosa beanii* and the arctic *Lycosa albohastata*.

His most interesting collection, however, was that of 1921 and 1922 in Labrador. Starting in the summer of 1921 at Natashquan on the north shore of the Gulf of St. Lawrence, where he collected the common *Lycosidae* and *Epeiridae*, he moved northward to Voisey's Bay in August and in September and October followed up the Assiwan River as far as Cabot Lake. At all stations the common spruce tree spiders *Linyphia phrygiana*, *nearctica* and *limitanea* were found in the immature condition in which they pass the winter, while *Lepthyphantes duplicatus* and *bihamatus* which live near the ground were in the adult condition in both sexes. At Voisey's Bay occurred the arctic species *Pardosa furcifera*, *Lycosa picitilis* and *Lycosa albohastata* and at Cabot Lake the transcontinental species *Hilaira brunnea* and *Pholodromus alascensis*.

At Nain, in May, 1922, all the spiders were in the same condition as in September, but after the middle of June all the *Linyphiidae* and *Lycosidae*, which wintered immature, were found as adults. The arctic *Lycosidae* and *Gnaphosa brumalis* were also mature. The rare *Lophocarenum quadricristatum*, known from the top of Mt. Washington, was also found and in meadows back from the shore *Singa variabilis* and *Tetragnatha laboriosa*, common species in New England and farther south.

Mr. Waugh's last expedition, in the summer of 1924, was again to the north shore of the Gulf of St. Lawrence, at Seven Islands. On May 26 he wrote: "I am getting ready to leave for the field and expect to go during the first week in June. I have my spider outfit packed already and hope to get a nice lot of specimens". In regard to his methods, he wrote: "In Labrador I beat all sorts of trees and shrubs on a ground sheet or small tarpaulin. I also shook out a lot of moss and lichen on the sheet. A great many of the *Lycosidae* I caught scurrying along the ground. I shall do a lot of looking under stones and such whenever I have the opportunity again". He had in mind writing an account of his collections of 1921 and 1922, and in this letter says: "I have deferred writing anything about my spider collections for *The Canadian Naturalist* as I should like to add the names of the new species after your article has appeared".

The collections of the 1924 expedition showed improvement in the absence of immature and over-common species and a larger proportion of those that were rare or new. Among the latter was *Ceratinella ornatula*, lately described by Crosby from specimens found in the Adirondacks, a new

Theridion resembling the well-known *Theridion montanum* and a new *Pellenes*, one of the jumping spiders in which the males are highly ornamented on the front of the head and on the first and third pairs of legs. Descriptions and figures of these are in manuscript and will appear in a future number of *The Canadian Entomologist*.

This collection contained considerable numbers of *Theridion montanum*, *differens*, *aurantium* and *sexpunctatum*, as well as the new species, but showed a marked absence of *Theridion zelotypum* which is so abundant in spruce forests, from Quebec westward through Manitoba. Other collections from the lower St. Lawrence and Labrador have shown the same absence, so it seems probable that this species does not occur in the Labrador peninsula. The collection contained a large number of *Lepthyphantes calcaratus*, *duplicatus*, *furcatus* and *bihamatus* which live in the moss and leaves of the forest and were abundant in the Labrador collections of 1921 and 1922.

Mr. Waugh returned in September, 1924, as far as Montreal, and there unaccountably disappeared, and nothing has been heard from him since, so it is left to me to write the deferred story about his collections.

A PLEISTOCENE FAUNA FROM THE SOUTH-WESTERN MAINLAND OF BRITISH COLUMBIA

By C. H. CRICKMAY



FEW years ago (1919) Dr. S. J. Schofield, of the University of British Columbia, then my teacher, drew my attention to a fossil locality which he had discovered.

This locality is a road cutting on the Pacific highway on the south side of the Fraser River, opposite the city of New Westminster. It is 2,100 yards from the south end of the Fraser River bridge and seventy feet above mean sea level (approx.). Collections have been made by me at this place from time to time, and have now been sufficiently studied to permit a brief notice of the fauna and its significance to be published. Since its original discovery, this locality was found by Johnston¹ who collected there and published a small faunal list in his memoir on this area². There is some lack of agreement between Johnston's list and my own. I have failed to find certain of his species, but since I have never seen his material, I am unable to explain this. But in view of the uncertainty, I have used the utmost caution in

identifying the shells, and have marked with an asterisk those species which are common. The names of the species which I have collected at this locality follow³:

- Strongylocentrotus of drobachiensis Muller.
- Terebratalia transversa var. caurina Gould.
- Leda fossa var. vaginata Dall.
- *L. fossa var. sculpta Dall.
- Pecten (Chlamys) hindsii var. Jordani arnold.
- *P. (Chlamys) hindsii var. kincaidi Oldroyd.
- *P. (Chlamys) hindsii Carpenter.
- P. (Chlamys) hindsii var. navarchus Dall.
- Pododesmus (Monia) macroschisma Deshayes.
- Astarte alaskensis Dall.
- *Cardium ciliatum Fabricius.
- C. corbis martyn.
- *Serripes gronlandicus Gmelin.
- *Saxidomus giganteus Deshayes.
- Paphia (Protothaca) staminea var. ruderata Deshayes.
- *Macoma incongrua Martens.
- *M. brota Dall.
- M. calcarea Gmelin.
- M. inquinata Deshayes.
- *Spisula (Hemimactra) voyi Gabb.
- *Schizothaerus capax Gould.
- Mya truncata Linne.

¹Pleistocene oscillations of sea-level in the Vancouver region, British Columbia. W. A. Johnston. Trans. Roy. Soc. Canada, vol. XV, 1921.

²Geology of the Fraser River Delta Map-area, W. A. Johnston. Geol. Surv. Canada. Memoir 135, 1923.

³Since this was written, Johnston's material has been examined by W. H. Dall, who finds *Pecten islandicus* to be present.

Panomya ampla Dall.
Lora cf. *fidicula* Gould.
Admete couthouyi Jay.
Chrysodomus liratus Martyn.
**Trichotropis cancellata* var. *quadracarinata* A. Adams.
Lacuna cf. *porrecta* Carpenter.
L. cf. *unifasciata* Carpenter.
Natica (*Cryptonatica*) *clausa* Broderip & Sowerby.
Puncturella galeata Gould.
Balanus rostratus var. *apertus* Pilsbry.

The present distribution of these species, all of which are living, is in the main to the northern part of the Oregonian and to the Aleutian faunas. There are no species in the fauna which fail to extend as far north as Alaska at the present time, moreover the two varieties of *Leda fossa* are now confined to the Alaskan coast. Many of the species are circumboreal in their present distribution. None range far into the warmer regions of the earth. All of which compels me to believe that this fauna represents an average sea temperature as low as, and probably somewhat lower than, that which prevails at this latitude on the west coast to-day.

There are also certain other conditions which it is possible to reconstruct. The shell bed is now seventy feet above sea-level. But the shells are not those of a littoral fauna. The absence of the ubiquitous *Mytilus edulis* known on the west coast from earliest Pleistocene, the presence of the large *Chrysodomus*, and finally the profusion of *Pecten hindsii* and its varieties, all show that the water was not shallow: It may have been anything from 20 to 100 feet deep. This means that sea level was anything from ninety to one hundred and seventy feet higher then than now. Also, it will be noticed that not only is the fauna typically marine, but two forms are present, an echinoid and a brachiopod, which are absolutely unknown in sea water of even a slightly diluted salinity. In view of this it is plain that no fresh-water stream of a size at all comparable with the Fraser could have emptied within a considerable distance (twenty miles or more) of this locality. A peculiarity of the fauna is the predominance of pelecypods, and large forms. Many of the shells show drill-holes attributed to the predatory gastropods yet in comparison with the total fauna the latter are very rare both in species and even more so in individuals.

The correlation of this fauna is a difficult problem. Since all of the thirty-two species are living, it is tolerably certain that the fauna is a late one. But the facts that the two varieties of *Leda fossa* are not known living nearer than Alaska, and that *Trichotropis cancellata* var. *quadracarinata* is not known living nearer than Japan, suggest strongly that conditions have changed greatly

since the burial of these shells: requiring the lapse of considerable time; so it is safe to say that the fauna is not quite so late as its 100% of living species might suggest. The variety of *Trichotropis* is interesting because it is an immigrant from the north which survived in Japan but failed to do so on the American side. It probably arrived in late Cenozoic or Pleistocene time, but as *Trichotropis* never ranged as far south as California, it did not find its way into the standard Pleistocene sections. This is unfortunate because it precludes for the present the possibility of dating the arrival of the variety in question on the west coast. But Johnston lists *Pecten islandicus* which, if present, would be a valuable help. However, in hundreds of specimens I have failed to find a single *islandicus*⁴ and therefore rather doubt this identification, especially as Johnston fails to list the somewhat similar-looking *kincaidi* which is common. Finally, 29% of the species occur also in the Saanich formation⁵. This, however, hardly proves a close relationship, especially as Arnold and Hannibal's lists are compilations without any reference as to sources. It must be confessed, therefore, that the purely palaeontological evidence is inconclusive as regards the exact date of the fauna. Perhaps the best idea of the approximate date of it is gained from the fact of the low temperature just proved to be one of the conditions under which the fauna lived. This limits it to latest Pliocene or Pleistocene.

There is some structural evidence. The relationships of the formations involved are shown in the sketch section:

The shells are contained in a bed of fine blue-grey mud about two feet thick. The shell bed is observed to overlies a mass of till which precludes the possibility of it being pre-Pleistocene. It is overlain by a delta deposit of gravel and sand, the age of which is not evident from this exposure. But the top of the surrey terrace lying a short distance above and behind this section is composed of glacial till which presumably overlies the delta gravels though the contact is hidden. The suggestion is, therefore, that the gravels antedate this upper till-sheet and are therefore of Pleistocene age, which limits the shell bed and its fauna to a Pleistocene date also. But it is still wholly uncertain where in the Pleistocene column these till-sheets belong. Obviously the problem must now be turned over to the field-worker because it depends on the correlation of the till-sheets of the region. So far, this difficult question has been singularly neglected, and yet plainly until correlation is attained we can say nothing with any conviction of telling the truth, of the detail of geologic history.

⁴See note on first page.

⁵The Marine Tertiary Stratigraphy of the North Pacific Coast of America. R. Arnold and H. Hannibal. Am. Phil. Soc., Proc., vol. 52, 1923.

THE WEASELS OF SOUTHERN MANITOBA

By NORMAN AND STUART CRIDDLE



IN BOYHOOD days we shared with others the popular belief that all weasels were harmful. Our father originally believed it and he had been so taught through contact with game-keepers of estates in England where all predatory creatures were looked upon as vermin. Weasels were, therefore, hunted on sight and killed with a persistency only exceeded in the equally unreasonable destruction of snakes.

Once, on a date unrecorded, several of us saw a large weasel in a wood-pile and, being possessed with the prevailing belief, we at once gave chase. The hunt was long, but eventually the weasel disappeared beneath some log buildings. We had hardly gathered around the hole, sticks in hand, before the weasel emerged with a mouse which it placed at the entrance and then disappeared down the hole, quickly returning again with another rodent, repeating this manoeuvre until eventually six were exhibited before us.

The train of thoughts to which this incident gave rise was a new one, and we paused in our hunt, but the courage of the animal, combined with the unmistakable evidence of its usefulness, soon created so profound an impression that we ultimately left the weasel in possession of the field and thereafter confined our efforts to observing rather than to killing, the present article being the result of our observations.

Our old associates, Messrs. E. H. and C. Vane, though now occupying their own homes, have continued to observe the habits of weasels and, from them we are indebted for many notes. E. Criddle has remained to work with us and much that we record below is his. A younger brother, Talbot, has also supplied us with reports of his experiences and finally, we are indebted to several neighbors who, imbibed with some of our desire for knowledge, have freely contributed observations.

The object in writing this paper at the present time, is to counteract several very biased accounts of the economic standing of the weasel which have recently appeared in print. We also hope to induce the same desire for observation and knowledge which the incident mentioned above created in us; feeling sure that observation will develop a very different idea of the habits of weasels from that which is at present held by the majority of people.

Southern Manitoba is inhabited by three species of weasel which may be recognized in life by their various sizes, and from specimen in hand by the following characters:

LONG-TAILED WEASEL, *Mustela longicauda* Bonaparte.—Tail long, about six inches, black tip extending well back. Total length of male seventeen inches, female thirteen inches.

BONAPARTE'S WEASEL, *Mustela cicognanii* Bonaparte.—Length of tail three and one-half inches, black tip short. Total measurement, male twelve inches, female nine inches.

LEAST WEASEL, *Mustela erminea* (Bangs).—Much smaller than the other two, not greatly exceeding a large mouse in size. Tail without a black tip.

All our weasels are brown above in summer time and they turn white in winter so that the weasel of the warmer months later become the ermine of commerce. The black tip, however, is always retained.

There is still much to be learned about the breeding habits of weasels due to the skill with which they conceal their dens. It is known that they make their homes in holes; a hollow log, an old gopher burrow or a mouse residence may supply the necessary accommodation and the fur or feathers of their victims are often used to line the nests. There is, seemingly, but a single litter during the year, which is probably cared for only by the mother. A family of young consists of from four to eight members. The hunting is done mostly at night and on this account the animals are seldom seen but the presence of a female frequenting a certain locality is a good indication that there is a family in residence somewhere near. The mother is, indeed, ever watchful in the interests of her offspring and she had been known to show great courage in attempting to defend them.

Young weasels, like most juvenile creatures, have a superabundance of energy which they exhaust by innumerable gambols together. In these antics they climb trees and run along fence rails almost as actively as a squirrel, and when fighting they eject a strong musky odour which is very noticeable when a family of youngsters is at play and still more so when two males meet in battle. Whether this scent is of any marked value under such circumstances is uncertain but there is little doubt that it provides some protection against other enemies.

As winter approaches, the weasel families separate, and each individual establishes its own headquarters, which is generally the former residence of some rodent. The nest of the former occupant being renovated and used as a sleeping place. There is a store chamber, perhaps some distance

away, in which surplus food is hidden for future use. Stores of mice, etc., are added to whenever opportunity offers, but they are seldom used when fresh victims can be obtained.

During the winter of 1921-22 a female long-tailed weasel made her home in the basement of the junior writer's house and her bed consisted of a bag of feathers, where she evidently slept in comfort, despite the people overhead. This animal had free access to the summer kitchen, where she made herself very much at home and helped herself to meat, milk and such other objects as were to her fancy. She eventually became quite tame and would readily climb up the observer's leg to take meat from his hand. Her store was never located, but her tracks showed that she often wandered more than half a mile away in search of food. About twenty Ruffed Grouse were frequenting the nearby woods at the time and most of them made regular evening visits to the house for food. The weasel, however, appeared to ignore them entirely.

Another Long-tailed Weasel took up its residence near the farmyard during the winter of 1922-23 and made its headquarters in a threshing machine. The nest was somewhat roughly constructed and consisted of a convenient bunch of straw and chaff under the cylinder. Well to the back was a pile of approximately three pounds of droppings which were found to contain a considerable amount of the hair of mice and rabbits, but no bird remains were present. This weasel had selected a store chamber some one hundred and forty yards away from the nest. Two bush rabbits had been dragged to the entrance and numerous smaller rodents were taken below ground. The rabbits were buried beneath the snow and eaten as necessity arose. This weasel had ready access to all the farm buildings but, in spite of the presence of poultry, confined its hunting to mice and rats.

The weasel is a born hunter and among all the carnivorous animals of North America we doubt whether any excel it in boldness and activity. So quick indeed are the animal's movements that it comes and goes, vanishes and reappears in a manner quite bewildering to the observer. Before the days of enlightenment, we cornered the animals more than once, at least we thought we had, but when the critical moment arrived for moving the last log or digging away the last sod, behold, the weasel was no longer there, having vanished as mysteriously as ghosts are supposed to do.

The weasel's animated nature induces it to wander far afield in search of prey. In summer its actions almost escape notice, but in winter the freshly fallen snow tells a tale that is unmistakable. There one may see the tracks leading in every direction, indeed there might have been a dozen

weasels present instead of one, judging by those innumerable footsteps. Very little escapes the attention of this animal; at one time following along a bush rabbit's runway, at another entering the burrow of a pocket gopher or darting at a mouse as the disturbed rodent attempts to escape. It may well be that while we are trying to trace the weasel it is more successfully observing us, because inquisitiveness is one of its characteristics. It is doubtless its fearless curiosity that makes the animal seem tame and there is no doubt that it would be much less frequently seen but for these traits. Its inquisitiveness, indeed, often leads it to destruction not only by dogs and cats but, alas, also by man.

The summer activities of weasels are much more difficult to follow than are those of winter and we can only guess at the extent of their rambles by the fact that it is almost impossible to set a trap in the vicinity of a weasel's abode without catching it within a few days, showing that it enters practically every hole in search of its legitimate prey.

Weasels like water both for drinking and washing themselves. A bird trough placed conveniently for observation purposes was frequently visited by these animals. In drinking they held their mouths very close to the water and as far as we could see, lapped the liquid up with rapid movements of the tongue. As a rule, after drinking, they would merely spring to the ground and vanish amid a bunch of scolding birds, but occasionally we have seen an animal slowly drag itself through the water and follow this performance by some rapid gambols, or a quick run, a method of drying which most of us have practiced in our youth.

Weasels have doubtless numerous natural enemies and it is possible that the smaller species are attacked by the larger. Among their more notable foes may be reckoned coyotes, foxes, badgers, hawks and owls. It hardly seems possible, however, that carnivorous creatures alone are capable of reducing weasels to a normal balance and we suspect that they suffer from diseases similar to those known to attack badgers and skunks. The smaller weasels are also affected by the food supply and there is a marked fluctuation in their numbers, dependent upon the prevalence of mice.

Man, as we point out elsewhere, is a very important factor in the survival of the weasel and it is largely in his hands whether these animals are perpetuated. His companions, the dog and cat, also play a leading part as weasel destroyers and each has a marked influence in keeping these animals from the barnyard.

The fact that weasels frequently kill many more animals than they require for immediate use has

been universally interpreted as a lust for killing—a supposition which we believe to be quite erroneous. It is true that weasels often kill more than they need, but the surplus is not necessarily wasted because the animals always store it for future use, in much the same way as do badgers, minks or skunks, and with the same object in view as squirrels have in gathering nuts. We have observed many such stores, but as far as our observations go, the habit of killing in excess occurs much more prominently in the late summer and autumn months than in the spring. Indeed, we have no records of excessive spring slaughter and this indicates that the supposedly blood-thirsty habit of weasels is no more a lust for killing than is the woodsman's foresight in providing his larder with meat for the winter months. It should be noted in this connection that members of the weasel family, when undisturbed, do not leave their victims scattered about, but carefully store them away, and in many instances the bodies are buried with earth or taken under ground in order to preserve them. We suspect that this instinct for preserving food for future use accounts for most of the excessive killing by carnivorous animals instead of this latter indicating an aimless desire for slaughter which would unnecessarily deplete the food supply of the future. This instinct, however, does not seem to be as definite as that of some rodents, and there is no doubt that much of the stored meat decays before it can be utilized.

The prevailing idea that weasels are alike in their food habits is no more true than is the claim that hawks and owls have identical habits. Indeed, a knowledge of nature will show that similarity in habits is not a common feature in allied species inhabiting identical territory. In the case of weasels, size alone should suggest variations in food possibilities and this is fully verified by a study of the animals.

The adverse criticism against weasels is based on the same form of evidence as is so constantly employed to condemn predatory birds, namely the occasional killing of poultry or the prominently displayed attack upon some game or song bird. In other words, the every day habits of the animals are overlooked while the casual ones, being more spectacular, are used as a basis for general condemnation.

Before we can arrive at the facts it is necessary to remember that there are three species of weasels involved which not only differ from one another in size, and therefore in capabilities of doing harm, but also in habits to at least as great an extent as our birds of prey. Each kind should thus be judged on its merits rather than collectively on conclusions drawn from observations on different species.

The species that lends itself most readily to popular observation is the Long-tailed Weasel, *Mustela longicauda*, an animal of great boldness and remarkable agility. Its food habits are much more varied than are those of other species and in killing its prey it is only limited by its power to overcome the animals attacked. Bush rabbits, *Lepus americanus*, are among the largest of its victims and even with these more young than adults are captured. Nevertheless, mature specimens are often overcome and on one occasion the junior writer saw a location where a weasel and a rabbit had rolled down a bank fully seventy feet high, the former retaining its hold on the latter with the pertinacity of a bulldog.

On another occasion, Mr. T. Criddle observed one of these weasels attacking a scrub gopher *Citellus franklinii*, which it had almost overcome when interrupted. The destructive pocket gopher, *Thomomys* sp., is another animal that suffers severely from the weasel; this appears to be especially true in winter, when the hunter boldly enters the rodent's burrow in search of it, and, after killing it, frequently makes the gopher's residence a temporary headquarters from which to make numerous raids upon other rodents in the vicinity. Innumerable instances could be quoted in which the victims of weasels were rabbits, gophers or mice. The shrill cry of a rabbit in the dark is nearly always due to a weasel's attack. Indeed, we have often watched the latter at work during the twilight hours. First would come the almost noiseless run of the small rabbit with its characteristic dodging and this would be followed by the appearance of the agile foe which, at times, would leap high over obstacles and at others move swiftly beneath them. Then there would follow intermittent cries of the rabbit as the weasel secured a temporary hold of its quarry, for be it noted that this hunter apparently bites anywhere to begin with and it is probable that the blood made to flow acts as an aid to tracking as well as weakening the prey. Several similar close encounters might occur before the rabbit would be finally overcome, but weasels are very persistent when they once get into contact with their victims and it is therefore very seldom that the latter escape. In killing, they either penetrate the brain with their teeth, or dislodge the vertebrae behind the head.

It is highly probable that some of these prolonged hunts are due to a playfulness on the part of the weasel, a phenomenon which is paralleled by the well-known cat and mouse performances. Indeed, Mr. Ronald Buckell assures the senior writer that he has witnessed encounters of this sort in England, the hunter being a stoat and the victim a rabbit. The stealthiness with which this

member of the weasel family would creep up to the rabbit and nip it and then stand high on its hind legs to watch where it went, was so obviously a matter of fiendish sport as to be unmistakable. Moreover, this playfulness was speedily terminated by a vital bite when the stoat tired of its sport.

Bonaparte's weasel is more secretive and less bold than its larger relative, and it is less often found in the haunts of man. We have discovered its home in winter time beneath old straw piles where it doubtless obtained abundant food by devouring the mice that congregate in such places. On one occasion, indeed, on moving some straw, we came upon eleven of these rodents, all neatly placed in a heap.

We have no record of Bonaparte's weasel killing poultry, and we doubt whether it ever does so. Doubtless the young of some wild birds are captured, but we must recall the fact that this can only happen during a limited period of the year. At other times, the destruction of birds is seldom possible and the weasel is consequently obliged to turn to mice for food.

The Least weasel, or as it might well be termed, the mouse weasel, is such a midget in comparison with the other species that it usually passes unnoticed unless caught in a trap. It is quite incapable of killing poultry, but, being small, it can readily follow mice down their holes or along their runways. It probably kills some nestling birds, and perhaps extends its bill of fare to insects. The following is taken from the manuscript of an article by the junior writer on *Microtus minor*.

"In 1922, these mice went into winter quarters in great numbers and their homes were well stocked with food. Three homes were under observation in which all went well until the middle of February, 1923. Then, within a few days, each was taken possession of by a Least weasel and the inhabitants quickly destroyed. One mouse residence near my house was occupied by a weasel for about two weeks, during which time I observed where several mice had been carried over the snow to the home. This mouse residence was examined in April and in it were discovered six dead *Microtus minor*, one *Eutamias*, the head of another and at least six or eight other remnants including *Microtus drummondii*, these last remains being chiefly indicated by the hair-lined nest of the weasel.

"The homes of twenty-seven other mouse communities were examined at this time and all were found to have been entered by weasels, the mice having been killed and partly eaten in each instance. Thus from being an abundant animal this species was reduced to insignificance in the course of a few weeks while all other kinds of mice had suffered severely from the same enemy."

Supply and demand are prominent factors in governing our weasels' food habits. The two smaller species, as we have already pointed out are so dependent upon mice for a living that they

increase or diminish with the fluctuation of these creatures. The Long-tailed Weasel, however, is not so easily checked by the temporary disappearance of any particular kind of game. If mice are scarce it devotes greater attention to gophers or bush rabbits and if these are not in sufficient numbers to satisfy its appetite, the animal raids a poultry house as a last resource. In nine years out of ten, this weasel will find sufficient food about the fields and woods, but on the tenth it may be obliged to temporarily turn to domestic animals. It is at such times that the weasel is seen and its deeds recorded. A thousand mice may have been killed in the meantime, but the destruction of half a dozen hens is alone used as evidence of the weasel's economic standing.

In the last twenty years we have permitted weasels to frequent the farm buildings at will and the poultry house has been no exception. In that time rats and mice suffered severely from the weasels, while the total number of poultry taken were six. Many times that number, however, have been killed by rats.

When we review our experiences of the past, we are astonished to find what few poultry have been killed by weasels. Our own losses in forty-two years have not exceeded fifteen birds and even these were usually eatable. There have been reports of losses from time to time from neighbors, but on looking into details we find that there are very few farmers who have experienced more than three separate occasions of weasel depredation and the total loss per farmer in the last thirty years does not, we are sure, exceed ten birds. This is surely a remarkably small payment to weasels in general for the great good done by them in killing rodents.

We wish to point out, too, that only the exceptional weasel becomes a poultry killer. In most cases apparently it is a fully-grown male that does the killing. There are exceptions, of course, but when we see a large weasel actively engaged in rodent hunting within a few feet of a brood of newly hatched chickens and not even looking at them, we must at least pause to ask if this animal is the enemy that we were taught to believe it to be.

Numerous wild birds necessarily fall victims to weasels, particularly in the breeding season when the young are helpless in their nests. It also occasionally happens that a mature grouse or duck is surprised and overcome, but we have not secured much evidence to indicate that adult birds suffer very greatly in this way. Indeed, the only occasion we can recall was when a weasel had dragged a Sharp-tailed Grouse over the snow and even in this instance there was no direct evidence to prove that the bird had been killed by the weasel.

FIELD NOTES

The notes presented below have been furnished from field observations made in the vicinity of the writers' home at Treesbank, Manitoba, and jotted down as the incident occurred. They are abbreviated in order to save space.

November 2, 1908.—A Long-tailed Weasel quite white, though bush rabbits are still brown.

November 21, 1910.—There is a Bonaparte Weasel about the farm buildings which has free access to the fowl-house. It is rapidly exterminating the mice.

October 3, 1913.—Observed a Long-tailed Weasel with a field mouse which it took down a hole. The former was white.

March 27, 1916.—A Long-tailed Weasel still white.

July 19, 1917.—T. Criddle saw a Long-tailed Weasel attacking a scrub gopher, *C. franklinii*. The rodent was in mortal terror and squeaked continuously. Eventually the gopher was thrown on its back and would have been speedily killed but for an interruption.

October 29, 1917.—C. Vane writes:

"A weasel last night made its way into our fowl-house, the door being inadvertently left open. The weasel killed eleven fowl, some of which were dragged into the yard. All the largest fowls were selected, the pullets remaining untouched though they were in the majority. Next night the weasel dug a hole beneath the building and killed a hen and two cocks, returning for another during the day, making a total of fourteen in all."

This weasel proved to be a large one, probably an old male.

October 31, 1917.—A *rixosa* almost white. It was evidently hunting for mice.

July 2, 1918.—Noted a Long-tailed Weasel with a freshly killed mouse near the farm buildings. This weasel was seen in the afternoon running off with a rat. Two small punctures in the throat were the only evidence of the manner in which its death had been brought about.

September 11, 1918.—A *longicauda* took seven pocket gophers placed near the Entomological Laboratory. It seized the rodents by the middle of their back and held them high while carrying them away. They were stored in an old gopher burrow some two hundred yards distant. One of these animals was tied to supports by both hind legs, which caused the weasel considerable trouble to free, but this was ultimately accomplished by biting the legs through above the string.

October, 1918.—Following a severe outbreak of mice in 1916-17, Bonaparte's weasel increased enormously and very soon reduced the rodents to comparative rarity. This resulted in a scarcity of food for the weasels, which in their turn became greatly reduced in numbers. It is interesting to

note that no poultry losses were reported during the period of mouse scarcity.

November 9, 1918.—Another Long-tailed Weasel about the farm buildings. Mice around the laboratory have vanished.

July 11, 1919.—Two *longicaudas* present. The poultry stretch out their necks and cackle when the weasels draw near, but the latter pay little attention and continue with their mouse hunting. They have been seen running off with rats on several occasions.

July 12, 1919.—The two weasels mentioned above have been joined by three more, the whole probably constituting a family. They have proved quite entertaining with their various antics but they show no inclination to attack our poultry despite the presence of numerous small chicks.

August 6, 1919.—A Long-tailed Weasel had a drink at the bird trough this morning and then slowly crawled through the water. It later frisked about as if to dry itself.

August 20, 1919.—A *longicauda* in the Insectary ran at me this morning apparently with a view to intimidating. It uttered a shrill cry while making the attack, but retreated after advancing within two feet. (This weasel remained around the farm buildings well into the winter.)

July 11, 1920.—There are two large weasels about the buildings which have the usual free access to the poultry-house. Each has been noted with rats and this afternoon one of them was seen running into the woods carrying a rat, followed by two excited swallows.

April 2, 1921.—A *longicauda* seen near Laboratory. It is still white.

April 18, 1921.—The above-mentioned weasel is now brown.

May 31, 1921.—Saw a Bonaparte's weasel capture a Red-backed Vole after a long hunt during which the pursuer never once lost track of its victim.

July 31, 1921.—A Long-tail drinking. The squeaking of a rat a few days previously had indicated the presence of a weasel.

August 21, 1921.—Heard cries of a small rabbit at dusk to-night, which investigation showed was being attacked by a large weasel. The rabbit was later carried to the weasel's store chamber below ground.

October 31, 1921.—A Long-tail almost white. It has been about the farm buildings for more than a month.

February 17, 1921.—Came across the marks of a weasel carting some object over the snow. An investigation revealed a recently-killed pocket gopher with its captor still in possession.

November 8, 1924.—Shot a bush rabbit and left it lying. Two hours later the rodent was

found to have been dragged beneath a brush pile and partly eaten. Innumerable weasel tracks left no doubt as to the identity of the thief.

January 31, 1925.—A Long-tailed Weasel killed three hens last night, and rather severely bit a cock about the neck. This, or another weasel, had been around the farm-yard for some time. (The specimen was a large male.)

At least twice within our memory, weasels have made their way into a temporary meat-house where, not satisfied with the ample supply of food available, they have proceeded to hide everything capable of being moved. In this way ox-hearts, suet and other delicacies have vanished down holes or behind boards and logs.

In the fall of 1924, Mr. A. Cooper, a prominent poultryman of Treesbank, observed a large weasel carrying a freshly killed rat which it stored below ground and then returned towards the poultry-house, causing no little apprehension to the owner. Within a short time, however, the weasel reappeared with another rat which it hid as before. In this way several rodents were accounted for during the afternoon, and Mr. Cooper assures us that the weasel "kept up the good work for some days".

Being a farmer of many years' standing, Mr. Cooper has naturally lost some poultry through the agency of weasels, but while he remarks that "there are good as well as bad actors among weasels", he has the practical good sense to recognize the value of an efficient ratter even though it be a weasel.

Our sister, Maida Criddle, writes under date of March 4, 1925:

"There is another weasel (*longicauda*) in the fowl-house, a well-behaved one this time. It came and took a piece of meat out of my hand quite nicely, which it carried down a hole and then came and sniffed all over my mitt to see if there was any more. I thought it had been killed when I visited the farm buildings next day as there was a strong smell of musk on the cat and in the fowl-house, but the weasel was there as cheeky as ever. It got hold of my skirt twice and tried to pull me down its hole. I think it wanted the cloth for a bed, as it was taking straw and other material down the burrow. The poultry were very frightened at first, but they are getting used to the weasel's presence now."

Once while ploughing, we observed a Long-tailed Weasel carrying a field mouse which it dropped, and ran down a hole. The junior writer then picked up the rodent and held it near the burrow, upon which the weasel came out and grabbed the mouse at its opposite end, pulling lustily, actually permitting itself to be dragged from the hole while thus occupied. Ultimately the weasel was permitted to retain possession of its prey.

On one occasion the senior writer saw a Long-tailed Weasel resting on a tree. It had squeezed its abdomen between a forked limb and was

hanging thus in evident pain. On being approached very closely it showed some inclination to fight, but changed its mind and moved instead to another limb, where it again squeezed its body between two branches. There was a most pathetic look upon the animal's face, almost as if it were requesting assistance. We have no doubt that it had eaten part of a poisoned mouse or gopher.

On another occasion a Long-tailed Weasel was caught in a trap set for gophers, and, on being released by Miss M. Criddle, at once turned upon its liberator and bit savagely at her boot. It then moved a short distance away to a tub of water, where it drank thirstily, merely glancing at the observer from time to time while doing so, and then ran off out of sight.

Mr. T. Criddle records a similar experience. After liberating a large weasel from a trap, it immediately rushed at him and persisted in its attack with such ferocity that it was three times picked up and thrown, on each occasion to a greater distance, before it finally abandoned its offensive.

We have no record of a weasel making an unprovoked attack upon anyone.

Hawks are not always the aggressors, as is shown by an incident reported by Mr. H. L. Seamans, of Lethbridge, Alberta. Mr. Seamans noted a large buzzard suddenly fly straight upwards from a fence post, and then alight upon another one some distance away. A little while afterward this bird once more arose in the same manner as before, and presently repeated the performance again. An investigation then followed and revealed that a Long-tailed Weasel was following the hawk from post to post.

We should hardly expect a weasel to attempt to capture a bird of the above type. On the other hand, it is possible that these animals might be able to startle a hawk sufficiently to cause it to drop its prey, which would thus provide food for the weasel.

CONCLUSION

In summing up the evidence for and against weasels, there are three important points to be considered. Firstly, the food habits are divisible into useful and harmful ones, depending upon whether the animal takes rodents or poultry and other useful birds; and secondly, there is the value of the weasel's fur, which represents an important asset. We have tried to show in the previous pages what the food habits are and we think that even the most prejudiced person must pause on beholding the evidence.

One at least of our weasels is almost wholly beneficial, and we have no hesitation in proclaiming this species, *rixosa*, the most useful of all

Canadian predators. Of *cicognantii*, the evidence in its favor seems overwhelming and we are, therefore, confronted with *longicauda* alone. What is the evidence? This weasel is a perpetual mouser, a hunter of pocket gophers, ground squirrels and rats, an enemy of bush rabbits, a stealer of young birds and a casual raider of poultry-houses. It is a destroyer of fully two thousand rodents for every fowl taken and the possessor of a pelt that surpasses any other weasel's in value.

As an illustration of the value of weasels' pelts, we would point out that more than fifty-four thousand were secured and sold in Manitoba during the year ending September 30, 1924, representing a value of approximately \$40,000.

It is evident that early training has had much to do with the prejudice against weasels and that the folk lore of other lands has influenced others as it influenced us in boyhood days.

In the past, the trapper has had the lives of these animals much in his own hands, and he has not, we regret to say, always used his privileges in the best interests of posterity. His object has usually been to kill as many as possible, and in this he has been ably seconded by the fur trade which, by advertising and circularizing, have done everything possible to increase the output of furs. No wonder, therefore, that fur-bearing animals are

becoming scarce or that noxious ones are over-running the country.

It is surely time to call a halt to these proceedings. Trapping is a legitimate trade with which we have no quarrel, but there are other interests to be taken into consideration, among which are those of agriculture. It seems to us that the farmer should be considered first in this matter. We all know of the enormous losses that are caused by gophers, mice and allied rodents. Grain crops, fruit trees and forests are all affected by these creatures. As the carnivorous animals have diminished in numbers, the rodent tribe have increased by leaps and bounds, causing untold mischief in so doing.

The remedy is largely in our own hands. Two important considerations are involved in this question, namely, the conservation of useful animals, and the preservation of our crops. These aims can only be accomplished by restoring the balance which Nature originally maintained, but which has been upset by man. Much has already been done with this end in view, but for reasons which we have already indicated, weasels which constitute one of the most important factors have been left out. There are no valid reasons for such a course, but, on the contrary, there is ample evidence to prove that these animals should be protected.

IN MEMORIAM

JAMES BALLANTYNE

Born March, 1835

Died April 6, 1925

An esteemed citizen, and a long-standing and deeply interested member of the OTTAWA FIELD-NATURALISTS' CLUB, passed from our midst into the great unseen on April 6th of the present year, in the person of Mr. James Ballantyne.

Mr. Ballantyne was born in March, 1835, at Newcastleton, in Scotland, and had therefore at the time of his decease entered upon his ninety-first year.

His parents came to Canada in 1840, when he was about five years old, and settled on a farm near Smith's Falls, Ont., and in the course of Mr. Ballantyne's career, he developed into a man of versatility and great usefulness, and over sixty years ago became a permanent citizen of Ottawa.

As a business man, he engaged successfully in many enterprises; as a public man, he took a deep interest in educational matters, and was intrusted with many municipal and county responsibilities, often consecutive for years; and

in the things of the mind, he associated himself as a member of numerous scientific and literary institutions.

He was a long-standing member of the Ottawa Field-Naturalists' Club, a regular attendant of its excursions and lectures, and contributed an article on "Our Squirrels", which was published in the June, 1888, number of the official organ of the club which, at that time, bore the title of the *Ottawa Naturalist*. And for long he was an auditor of the Club.

He was also, for upwards of forty years, a member of the former Ottawa Literary and Scientific Society, a member for many years of the Horticultural Society, and for some years a member of the Camera Club; and with great liberality of thought, Mr. Ballantyne was a man broadly tolerant of all who aimed for the betterment of the world; and all who knew him best will ever remember the efficacious and exemplary life which he led.—A. H.

NOTES AND OBSERVATIONS

UNUSUAL FORM OF *Trillium grandiflorum*.—There is an area of unknown size extending from London to at least eighty miles east along Lake Erie, and some distance south-west, in which this plant shows variations that are entirely outside of the limits set by the authorities. Last year I visited a woods where the aberrant forms are numerous and brought home a number of them which I planted without record, and am surprised to find that some of them are more nearly normal this year. This unexpected state of affairs led me to visit the same woods again on May 10th, 1925, and I am planting some of them in my garden, taking careful note of their individual characteristics.

Normally, this species has a six-angled ovary, but only one of all these plants conforms to that detail, nearly all the rest having three-angled ovaries, though some of them have none.

The normal leaf of this species here is practically sessile, but there are only three of these that are quite so. Of the twenty other plants referred to here which should have sessile leaves, nine have petioles of one-half inch or less, one has petioles about one inch long and five vary from two to four inches. Then there are three amazing plants that have no leaf at all—nothing but the sepals and petals all in a group.

These variations come almost invariably on the plants which depart from the custom of having white flowers, there being only four plants in the whole series that have white petals, the rest having a varying proportion of green; sometimes only a thin light stripe down the centre, in others the stripes become wider and wider until finally the green reaches the edge, and then the end of the petiole is the only part that shows white, and even this does sometimes vanish. It will be a very interesting experiment to try and raise seed from some of these forms, but seed is not frequently met with. I have now in the garden one clump from last year's planting which grew all together in the woods as though the plants resulted from one pod of seed. This group shows sessile and petioled leaves, also pure white and green and white flowers.

The shape of the leaf varies also, some of them are narrow, and some nearly round with an acuminate tip.

I shall now refer to a few individual plants.

Plant E. with Petioles one-third inch, three angled ovary and white petals, has a rounded leaf, the tip being abruptly acuminate.

Plant H. is a particularly interesting one with two stems from one root; the petiole lengths are one-third and one-half inches; one stem has one

white petal and two petals that are green in the centre, and the other has one petal white with a thin light green stripe; another petal has a wider, heavier stripe in the centre and the third petal is divided at the centre line, one-half being white and the other half green.

Plant O. has two petals and three sepals. The petals have a narrow green stripe and one of the sepals is half white.

Plant Q. has only a single leaf, which comes up a long stem from near the root, where it joins the flower stem.

There are six without leaves at all. One of these has two of the stamens changed into crinkled petals three-quarters inches long, the whole flower being white. One very beautiful flower picked by one of the party and the root not taken, had six equal petals, each with a brilliant green stripe one-eighth inch wide and it had also six stamens and three sepals.

This last flower illustrates in concrete and emphatic form the absolute disregard which this species shows for the usual custom of nature in making all the plants of the species in close resemblance with each other.

Gray's Manual makes the best reference to these unusual forms, as follows: "Monstrosities are not rare, with the calyx and sometimes the petals changed to leaves, or the parts of the flower increased in number," but this reference is entirely inadequate. The description of the species should read something like this: Leaves three, or two or one or none, varying from sub-sessile on the stem to radical leaves with petioles four inches or more. Petals usually three, varying from the usual white, through white with a green central stripe, to a solid green; ovary, usually six-angled, sometimes three-angled or absent.—W. E. SAUNDERS.

THE INCREASE AND PRESENT STATUS OF THE STARLING (*Sturnus vulgaris*), AT TORONTO, 1925.—It is well known that the Starling has become established in the Toronto region, but it seems advisable to record the rate of increase and the present status of the species before the local reports become too obscure to bring together.

The earliest record of the Starling for the Toronto district is that of Fleming¹, who saw a flock of seven flying over his garden in the central part of the city on August 24, 1920. The next recorded observation was that of Harrington², who mentions having seen a flock of five on December 3, 1922, at Lambton Mills, just west of

¹Fleming, J. H.—"The Starling, *Sturnus vulgaris*, at Toronto, Ontario". *Canadian Field-Naturalist*, Vol. XXXVI, page 15.

²Harrington, Paul—"Notes on Prairie Warbler and Starling". *Canadian Field-Naturalist*, Vol. XXXVIII, page 58.

the city limits. About the same time, Mr. E. Brown informed the writers that several pairs were frequenting Cedarvale ravine, in the north-central part of the city. A large winter flock was also noted by Harrington³ (at Downsview, north-west of the city), on December 19, 1923. From this date on, Starlings have been noted by local observers over an increasing area and with greater frequency. The species doubtless invaded the Toronto district from the south and west and became established as a breeder in the rural districts in that direction. During the winter of 1923-24 members of the Brodie Club repeatedly reported the Starling from the adjacent country west of Toronto, large flocks estimated at one hundred individuals having been seen.

On April 26, 1924, Harrington found the Starling breeding at Cooksville, west of the city, and again on the annual field-day of the Brodie Club, May 18, 1924, Starlings were noted as nesting at the same place. An interesting note in this connection is that the birds have established themselves in the hollow, horizontal arms of the Hydro-Electric towers. Such a nesting sit is inaccessible and offers an almost unlimited advantage during the breeding season. On May 25, 1924, a single pair was noted by Snyder as nesting in an abandoned Flicker hole in a dead elm near Pottageville, north-west of Toronto. No other local breeding records have been reported, but the species has increased so that during the winter of 1924-25 it could be seen regularly at several places in and near the city. A flock of one hundred and fifty birds was noted as frequenting a garbage-dump in Cedarvale ravine during the past winter.

Stuart L. Thompson collected two specimens on February 9, 1925, near Leaside, in the Don Valley, which were the first specimens to be taken and also the first evidence that they had encircled the city and are now to be found in the more easterly sections of the district. One of the specimens is in Mr. Thompson's private collection and the other is in the collection of the Royal Ontario Museum of Zoology. A third specimen, in the collection of J. H. Fleming, was taken on March 3, 1925, by H. Haugh. These are the only specimens which have been taken in the district that are known to be in scientific collections.—L. L. SNYDER and JAS. L. BAILLIE JR.

THE FROG EATS THE BIRD.—The bird eats the frog and the frog eats the bird, and that is the way of the wild. In August, 1923, I captured a bullfrog in Grant Lake, near Burbidge, Quebec, which had shortly before swallowed an Olive-sided Flycatcher. Though this bird was fully grown, its beak showed slight indications of juvenility.

A few years ago I found a bullfrog in the Rideau River that had engulfed a young Baltimore Oriole. The bird had probably fallen from a nest overhanging the water, as it was not sufficiently well developed to attempt flight.

Several captive bullfrogs in the National Museum have swallowed young mice, young water snakes and young leopard frogs, all living, with great gusto, and have shown no signs of hiccoughs as did Kipling's whale that swallowed the Mariner.

I have found the stomachs of frogs to contain such inanimate and unnutritive articles as the cones of the alder, which would point to the conclusion that the bullfrog snaps up any moving object, even, to his sorrow, a bit of red yarn in which a fish-hook is concealed. The cray fish seems to be one of the most desirable of frog foods.

In the stomach of a Red-tailed Hawk taken on the Queen Charlotte Islands, I found the dismembered remains of two toads.

In May, 1923, Mr. R. O. Merriman, of Hamilton, Ontario, sent in two De Kay snakes labelled, "articles from the larder of a migrant shrike." These snakes, the larger of which measures thirteen inches, have been pierced by a thorn or a barb but are otherwise only slightly mutilated.—CLYDE L. PATCH.

A DUPLEX NEST OF THE PHOEBE.—On May 13, 1925, a lady brought in for my inspection a nest of the Phoebe which exhibited what was to me a novel method of circumventing the Cowbird. The nest was built on her verandah and apparently when just about completed, the Cowbird laid an egg in it. The Phoebe promptly proceeded to build a new nest, but instead of making an addition above the first nest, as is the well known habit of the Yellow Warbler, she built the second one alongside the first, and the wall between the two adjoining cavities is completely finished and woven together just as all the other sides of both nests.

The result is that each nest is a complete and finished unit although they are connected at the one side where they adjoin each other, and the outer walls of the whole are completely finished and continuous. Efforts of this character in the bird world are sufficiently rare to make this occurrence noteworthy.—W. E. SAUNDERS.

THE HOODED WARBLER (*Wilsonia citrina*) IN ONTARIO.—As this species is of rare occurrence in this province, it seems advisable to record here, four hitherto unpublished records which have come to my notice recently and also to bring together as many of the old records as possible with a view to establishing its present status as an Ontario bird.

³Harrington, Paul—*Ibid.* .

The first published notice of this species in Ontario appeared in *A List of Birds of Western Ontario*¹, reporting it as "Very rare; only one specimen taken". This specimen, I am informed by Mr. Saunders, was taken at Hyde Park, Ontario, about 1880, by John A. Morden. After an interval of over twenty-five years, the second authentic record for the province was collected in the Don Valley, Toronto, on May 24, 1907, by Stuart L. Thompson. It is a male and is still in his collection. Five years later, in 1912, W. E. Saunders collected a juvenile female at Point Pelee on August 12. A male, the fourth Ontario record, was taken on Hamilton Mountain, May 18, 1920, by Fred Garritty. This bird was sent in the flesh to H. B. Haugh, of Toronto, to be mounted, is still in Mr. Haugh's collection and has been examined by me. The fifth and last record we have of this bird, is a female, collected at Point Pelee, April 23, 1924, by W. E. Saunders.

Hypothetical records are as follows: There is a notice, published by Macoun, on the authority of Rev. C. J. Young², as follows: "A specimen of this warbler, rare in Ontario, was captured at Cataraqui, near Kingston, Ontario, and is now in the collection of a resident there". Mr. Edwin Beaupre, of Kingston, has informed me, under date of March 2, 1925, that the collection is still extant, including the Hooded Warbler in an excellent state of preservation but that unfortunately no data whatever accompany same. The collection, he says, was probably formed about 1890. Under the circumstances, it seems advisable to consider this purely a hypothetical record, since it seems probable that the exact place of capture will never now be definitely known. Fleming³ records two specimens in his hypothetical list in *The Birds of Toronto, Ontario*, which he says were no doubt taken there.

There are a number of authentic sight records which must be considered, as follows: Saunders⁴ reported that "some specimens were taken at Rondeau in the spring of 1884 by Mr. (H. P.) Atwater". Writing to me under date of February 26, 1925, Mr. Saunders emphasized the fact that Atwater did not collect specimens but certainly heard individuals sing repeatedly and saw them. McIlwraith⁵ reported that he "once found a young male at Hamilton—towards the end of May", and further states that "it was found occasionally by Mr. Norval at Port Rowan". (A male was seen by B. H. Swales on Belle Isle, Detroit River, on

September 19, 1903, and another male was seen by him there on May 6, 1920⁶.)

In Macoun's *Catalogue of Canadian Birds*, is recorded a specimen as having been taken at Woodstock in May, 1916, by J. A. Cole. Mr. Saunders informs me that this record has since proven to be false and that Mr. Cole concurs with him in dropping the record.

In conclusion it will be seen that the Hooded Warbler is a rare migrant into Ontario, appearing only about the shores of Lake Erie and Lake Ontario. The fact that a young bird was taken in the early autumn seems to point to its breeding in the province, but as yet we have no conclusive evidence of its doing so.—JAS. L. BAILLIE JR., Royal Ontario Museum of Zoology, Toronto, Ontario

THE INTRODUCTION OF THE MUSKRAT AND THE ROCKY MOUNTAIN GOAT ON VANCOUVER ISLAND.—In connection with the endeavour of the Club to record all acclimatization experiments in Canada, we are greatly indebted to Mr. M. B. Jackson, K.C., Chairman of the Game Conservation Board of British Columbia, for particulars here related concerning the introduction of these two species.

MUSKRAT (*Ondatra zibethica*).—The muskrat is not indigenous to Vancouver Island, although it seems that there are places on the island eminently suited to them. As they would prove a valuable addition to the fur resources of the island if they succeeded in adapting themselves to conditions there, the Board had a small number trapped in the Lower Mainland during the past twelve months and they were released at Shaw Creek Game Reserve, Ucluelet, Jordan River, Port Alice, Hopkins Lake (Merville), and Comox, where reports indicate that they have done exceedingly well. It is the intention of the Game Conservation Board to remove a large number of the muskrats from the dyked areas on the lower Fraser River, where they are something of a menace and plant them in other suitable locations.

ROCKY MOUNTAIN GOAT (*Oreamnos montanus*).—Although Vancouver Island is apparently an ideal locality for this species, it does not occur there. Through the kind offices of Mr. J. B. Harkin, Commissioner, Canadian National Parks, the Board secured four goats from Banff, Alberta, in January, 1924, and these were released in the Elk reserve at Cowichan Lake, Vancouver Island. They have not been seen since, but it is the opinion of the officers of the Board that they have sought the higher peaks, possibly at Mount Arrowsmith near Barclay Sound. The board is going to make a determined effort to acclimatize the Rocky Mountain Goat on Vancouver Island, because they

¹J. A. Morden and W. E. Saunders. *Canadian Sportsman and Naturalist*, II, 1882.

²John and J. M. Macoun. *Catalogue of Canadian Birds*, 1909, p. 672.

³J. H. Fleming, *Auk*, XXIV, 1907, p. 88.

⁴John and J. M. Macoun. *Catalogue of Canadian Birds*, 1909, p. 672.

⁵Thos. McIlwraith. *Birds of Ontario*, 1894, p. 381.

⁶Bradshaw H. Swales. *Auk*, XXXVII, 1920, p. 463.

will provide additional objects of interest, and so that there will be another game mammal for the sportsman. In this connection it should be mentioned that a vigorous campaign is being waged against the cougar, it being thought that its elimination will aid in the increase of both goat and wapiti.—HOYES LLOYD.

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DEPARTMENT OF MINES

FIELD PROGRAMME, 1925

Biological Division:

DR. R. M. ANDERSON, Chief of the Division, expects to spend the latter part of the summer and early fall in biological reconnaissance work, principally collecting mammals and birds in eastern Ontario and eastern Quebec, south of the Gulf of St. Lawrence.

MR. P. A. TAVERNER, ornithologist, will spend the months of June and July collecting specimens along the Red Deer River, in Alberta, with a view to clearing up doubts as to the breeding forms of the localities traversed and particularly to study the red-tailed hawk. He will be assisted by Mr. C. G. Harrold who, during the months of April and May, was engaged in southern Manitoba in securing for the Museum specimens of migrant blue geese.

DR. M. O. MALTE, Chief Botanist, with Mr. W. R. Watson as assistant, is spending the summer in the foothills area of the Province of Alberta from the International boundary north to the Yellowhead Pass. His work is being done with a view to consolidating the botanical knowledge of the region in question, which so far is comparatively vague.

MR. C. H. YOUNG is engaged in the collecting of material for the scientific staff of the Museum in selected localities in the Provinces of Nova Scotia and New Brunswick, and Mr. C. L. Patch and others will make short collecting trips from Ottawa in the interests of the Museum.

MR. HAMILTON M. LAING, through the courtesy of the Mount Logan Expedition of the Canadian Alpine Club, was allowed to accompany it for the purpose of collecting natural history specimens. The area to be traversed is one from which we possess no material and concerning which we have but very vague knowledge.

MR. J. D. SOPER, in the summer of 1924, was despatched as naturalist by the Museum with the expedition sent to Baffinland by the Northwest Territories Branch of the Interior Department. He wintered in the North and it is expected he will return to Ottawa when the Interior Department's boat makes its prospective trip during the summer of 1925.

MR. W. S. ODELL will, as opportunities present themselves, collect mushrooms and fungi in the vicinity of Ottawa.

Anthropological Division:

DR. E. SAPIR, Chief of the Division, after completing some work in the office, plans on engaging in research on Athabaskan and Haida Linguistics at the Hupa Reserve, California, and Queen Charlotte Islands.

MR. H. I. SMITH will have as his principal work the direction of work intended for the preservation of totem poles in the Skeena River district, B.C. This work is being financed by the Department of Indian Affairs and the Canadian National Railways is co-operating in the work. Mr. Smith will incidentally carry on archaeological and ethnological work as opportunities present themselves.

MR. W. J. WINTEMBERG is engaged in archaeological reconnaissance in the provinces of Saskatchewan and Alberta. The tentative route laid out for him extending from Estevan, Saskatchewan, to Edmonton, Alberta, to Macleod Alberta, and from thence easterly along the International boundary to the western boundary of Manitoba.

DR. C. M. BARBEAU is engaged in intensive study of the folk technology and colonial arts and crafts of the ancient French colony of Quebec and vicinity. The headquarters for this work will be on the Isle of Orleans.

PROFESSOR L. BLOOMFIELD will be engaged in a study of Cree Linguistics for a period of three months. His work will probably be carried on in the Province of Saskatchewan.



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THE CHRISTMAS BIRD CENSUS AT ARNPRIOR, ONTARIO

By CHARLES MACNAMARA



FOR twelve successive years now Liguori Gormley and I have taken a Christmas Bird Census in the vicinity of Arnprior, and a survey of the figures may be of interest. Unlike an official census of a human population, our Bird Census does not pretend to count every individual bird in the district. Its figures are index figures only, representing the *relative* numbers of the different species, and not the total number present each year. But the count having always been made under fairly uniform conditions, the figures are comparable among themselves, and give a good idea of the rise and fall of the winter bird population in the vicinity from year to year.

Travelling separately, we have always gone over approximately the same territory. Liguori's route lies towards the west, and mine eastward from the town, and between us we usually cover about twenty miles. Our hunting ground, which stretches along the south shore of the Ottawa River, is mostly rough, rocky country, well wooded with both evergreens and deciduous trees, and includes a few fields and clearings, and a couple of beaver meadows with small streams flowing through them.

The weather of the twelve Christmases was about evenly divided between clear and cloudy. Two years it snowed. Only one year (1923) was the ground bare. Usually the snow lay three to five inches deep, while on four occasions it ranged from twelve to sixteen inches, and we had to use snowshoes. We have always started out with the thermometer below freezing point, and five times it was below zero, the lowest being 10°F. below. Only twice did it rise above 32°F. while we were making our rounds.

From these low temperatures it is plain that our regular winter residents must be real birds of the north. The tide of summer migrants, ebbing southward in the fall, sometimes leaves behind an odd Song Sparrow, or a Blackbird or Robin, which manages to survive in some sheltered place for part of the winter at least. And the remarkably mild winter of 1923-24 (I found dandelions in blossom on Christmas day) bestowed on our census of that year the unusual records of a White-throated Sparrow and a Tree Sparrow. But all

these birds, though quite at home here in the summer, are accidental at Christmas time, and have no right place among our winter birds.

The only native bird that is known to be a really permanent resident here all the year round is that hen of the woods, the Ruffed Grouse (familiarly: the Partridge). While a good many other birds are to be found here both summer and winter, it is doubtful if the same individuals stay throughout the year. This is a point that bird-banding will eventually clear up, but it seems probable that the summer residents migrate southward in the winter, and others of the same species come down from the north and take their places. The Ruffed Grouse, however, rarely moves more than a few miles around in its district.

Even under uniform conditions of game protection—or, as it generally is, lack of protection—the number of Ruffed Grouse in a district varies a great deal from year to year, and is supposed to depend largely on the spring weather, a cold wet May and June being bad for the chicks. However it may be, adequate protection from hunters would do much for the birds. In 1913, when we took our first bird census, the Grouse around here were at a low ebb, and we found none at all that year. During the next five years we recorded only from one to three each census, rising to five birds in 1919, perhaps as the result of an extra favourable breeding season. Then, in 1920, part of the census district was declared a Provincial Game Sanctuary, and that Christmas we counted fifteen Grouse, and the next Christmas, twenty-eight. Man, the most destructive factor in their problem of how to live, having been eliminated, they outstripped their natural enemies in increase. But the balance of life was soon restored. The natural enemies, also sheltered in the Sanctuary from human harm, soon caught up. Probably unfavourable weather came in, too. For, in 1922, the number of Grouse was down to eight, and for the two succeeding years it has been five and again eight. This indicates a Grouse population of only about one-third as many as when they were unharassed by other predatory animals as well as man, but about two and a half times as many as the average before the Sanctuary was established.

CHRISTMAS BIRD CENSUS AT ARNPRIOR, ONTARIO, FOR TWELVE YEARS

Species	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924
Duck, sp.							1				2	
American Golden-eye	1					4	2	1			3	
Canada Ruffed Grouse		3	1	3	2	1	5	15	28	8	5	8
Hawk, sp.				1		1					1	
Screech Owl										1	1	
Great Horned Owl					1							
Hairy Woodpecker	1		2	1	2	3	2	3	2	5	6	6
Downy Woodpecker	2			2		5	4	3	3	10	2	7
Arctic Three-toed Woodpecker						1	1					
American Three-toed Woodpecker												1
Northern Pileated Woodpecker							1			2	1	2
Blue Jay	1			1	2	3	1	3		10	3	
Canada Jay									1			
American Crow	1	1						23		2	1	
Bronzed Grackle										1		
Evening Grosbeak	heard		31	60		52	67		32		44	20
Pine Grosbeak				17		9	28		13			
Purple Finch	1	21								49	1	
White-winged Crossbill							11	46		230		
Redpoll	6						11		36	22	3	4
American Goldfinch	18	77						1				
Pine Siskin				11	15	heard	54			59		
Snow Bunting	20	3				heard	3	37	heard		5	
White-throated Sparrow											1	
Tree Sparrow											1	
Song Sparrow								1		2	1	
Cedar Waxwing												2
Northern Shrike			1			2	1				1	
Myrtle Warbler											1	
Brown Creeper	2	1		1	3	3	3	16		5	1	7
White-breasted Nuthatch		5	2	3	10	5	4	7	2	18	6	8
Red-breasted Nuthatch		3	1	13			1	5	3	19	6	14
Black-capped Chickadee	19	16	20	23	21	74	40	39	33	51	48	60
Hudsonian Chickadee									2			
Gold-crowned Kinglet					4			5			2	2
Total Species	12	9	7	12	9	15	19	15	12	17	24	13

While the Ruffed Grouse may be found in much the same haunts at all seasons, a bird more characteristic of the winter alone, and the one species that appears in all our twelve censuses without a break is the Black-capped Chickadee. Of course, there are Chickadees here in the summer also, but they are few and wild and mistrustful, quite unlike the flocks of confident little birds we meet in winter calling cheerfully to one another, and often tame enough to alight on the observer's head or shoulder. Their "*phoebe*" call properly belongs to the springtime, when even a Chickadee's fancy lightly turns to thoughts of love. But Liguori's expert rendering of it always brings an unseasonable answer, even in midwinter. The Black-caps' duskier, hoarser cousin, the Hudsonian Chickadee, we have recorded in our census only once. It is not such a very rare visitor, but only once have we happened to see it at Christmas time.

Another bird representative of winter is the White-breasted Nuthatch. It, too, is here more or less all summer, but is much more noticeable in the winter. The birds usually travel in pairs, and often with a flock of Chickadees, their low-toned, nasal "*quank, quank*" being a familiar accompaniment to the high-pitched "*chick-a-dee-dee*". The smaller Red-breasted Nuthatch is not so reliable, and while some years it is more plentiful than the White-breasted, other years it is entirely absent.

Another uncertain bird is the Brown Creeper, which fluctuates in our census from nothing to sixteen. It is, however, very easy to overlook the Brown Creeper. Close pressed to the bark, it zig-zags inconspicuously up tree trunks, always commencing at the bottom, and it takes a keen ear to catch its extremely fine-drawn note.

The tiny Gold-crowned Kinglet, which is listed four times, is another bird we may have missed some years when it was here, but it is never numerous and belongs among the more unusual winter birds.

The Woodpeckers are a hardy family. Of the eight species known in Eastern Canada, our census records five. The Hairy Woodpecker is one of the dependable winter birds, never very plentiful, but always on hand. Of late years, probably owing to the protection afforded by the Game Sanctuary, we have been able to include a Pileated Woodpecker or two. Twice we have entered the scarce Arctic Three-toed Woodpecker, and last Christmas I was lucky enough to come across the rare American Three-toed Woodpecker on the appointed census day. Liguori, being a better ornithologist than I, nearly always contributes the best finds. So when we met in the evening to compile our lists, I announced my American Three-toed Woodpecker with a flourish of pride. Alas!

he countered with the unique record of two Waxwings, which, he said, *might* be Bohemians, but so as not to claim too much, he would put them down as Cedar Waxwings.

But there is little excuse for missing any Woodpecker within a quarter of a mile. A Woodpecker's waking hours in winter are all spent hammering a laborious meal out of a tree, and the blows can be heard a long distance through the quiet woods. If you hear what sounds like a man chopping with a hatchet where no man can possibly be, you may safely put it down to a Pileated working for his dinner. The smaller species naturally do not make so much noise, but even the little Downy's tappings carry a long way.

In contrast with old reliables like the Chickadees, Nuthatches and Woodpeckers, are the erratic Grosbeaks, whose comings and goings no man can know. In the last twelve years, the Evening Grosbeaks have visited us seven times, generally coming two years in succession with an absent year between. When they do come they appear in the early winter in flocks of twenty-five to one hundred birds, and stay around town until April or May. We have never noticed them far out in the woods. The Pine Grosbeaks, on the other hand, are birds of the open, and do not often come to town. Ash seeds scattered on the snow are a good sign of their presence. They are rarer visitants than the Evening Grosbeaks, and we have recorded them only four times.

The large Finch family (to which the Grosbeaks belong) furnish half-a-dozen other winter representatives. But some years they do not arrive in time for the census, and a good many years they are missing all winter. Thus there are large gaps in the record of the Purple Finch, White-winged Crossbill, Redpoll, American Goldfinch, Pine Siskin and Snow Bunting.

Our count of White-winged Crossbills in 1922 was greater than that of any other bird at any time, but we have seen it here only three winters. The American Crossbill also came in the winter of 1922-23, but too late for the census. The Snow Bunting has sometimes been absent from our list because all of the species in a district often congregate in a single flock which moves about erratically, and several times we have failed to find them until after Christmas.

As there is very little open water here in winter, our duck records are few. Every winter, as long as I can remember, two or three American Goldeneyes have come to fish in the rapids below the mill dam, but usually they arrive too late for the census. Birds of prey are scarce also, and the few hawks observed were too far away for certain identification. The Northern Shrike is always here some time during the winter, but not often

in the right time for us. Twice only have we recorded the Screech Owl and once the Great Horned Owl. Perhaps if we had stayed out later in the evening we would have improved our owl records.

There are other well known winter birds that make only intermittent appearances in our lists. The Blue Jay was missing four years, but we feel that when absent in name he may sometimes have been really present in body. Boisterous and unmannerly as he usually is, the Blue Jay in cold weather is often mute and retiring. When in this mood he slips secretly through the trees, and is hard to find. Thus on Christmas Day, 1924, neither of us sighted or heard a single Blue Jay. Two days later we saw three or four.

The Canada Jay seldom ventures this far into civilization. It prefers the boundless contiguity of shade farther north where it is unbroken by man's desecrating clearances. Every five or six years, however, a few of the birds may visit us for a month or so, and in 1921 the visit happened to come at Christmas, giving us our only record of the "Whiskey Jack".

A few American Crows occasionally winter near here in some sheltered wood. In the cold weather they are quiet and dejected, and not at all like

the garrulous birds of summer. They stick close to their retreat and rarely travel about the country until spring.

A bird that should, but does not, figure in our Census is the European Starling. The first scout of what is likely to be a Starling invasion arrived at Arnprior in April, 1922. He was "collected", and no more were seen until the 3rd January 1924, when another one appeared—too late for the Census—and survived several adventures around town, (once it was caught in a hen house but escaped) until in April it was joined by a mate. During the summer the pair were lost track of but may have nested here. Our next record is the 5th January, 1925—again too late for the Census—when six birds were seen. Since then, records are numerous, and two pairs at least are known to have nested. One couple, appropriately enough for birds of the Old World, picked on the cornice of the Lutheran Church as a good site for a home.

As yet the birds are relatively few and have attracted no public attention. But these are probably only the first trickles of the flood, and in a few years Starlings may be as familiar in this part of the country, and as little welcome, as the English Sparrow.

FURTHER BIRD NOTES FROM SOUTHERN VANCOUVER ISLAND

By J. A. MUNRO

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Larus glaucescens. GLAUCOUS-WINGED GULL



ON JULY 23RD, 1924, through the courtesy of Dr. Chester Brown, of the William Head Quarantine Station, I was taken on the launch *Evelyn* to the Race Rocks, some two miles off Rocky Point. The launch stopped fifty yards off shore and we rowed to the largest of the rocks north of the light station. A decided swell on the dead calm sea, but a better day could not have been chosen, clear and hot and still—with a wind it would have been impossible to land.

The island on which we landed is roughly an acre in extent, there is no soil or vegetation and the jumbled rocks are worn smooth by the surf that, during winter gales, probably sweeps clear over the summit. This is the highest of the Race Rocks, excepting the one on which the light station is built, all the others are submerged during high tides. It was found to be occupied by a colony of Glaucous-winged Gulls estimated at seventy-five pairs, and a few Pigeon Guillemots. As we approached in the dinghy, the former rose and circled the island, rising higher after we landed. Elsewhere, nesting gulls of the same species were

observed to show much more solicitude for their eggs than did these birds for their young.

Young birds were found in various stages of development from downys only a few days old to half-feathered fledglings, the majority being about four weeks old. Only the youngest downys were in nests; older birds crouched motionless in the numerous rock crevices usually with head lowered as far as possible or else thrust into a cranny too small to admit the body. After being banded they would run over the rocks to again crouch next the first obstacle encountered. When handled, these youngsters cried and bit and invariably regurgitated the contents of their gullets, which consisted of young herring.

To band young gulls with speed and comfort, two operators are required, one to hold the bird while the other adjusts the band. Thirty-six birds, were banded, probably a third of the juvenile population.

Some nests were fairly substantial and all were composed of fine twigs, grass and moss; this material having probably been carried from the mainland, two miles distant, for there is no vegetation on the rock. Three nests containing eggs were noted 1/1, 1/2, 1/3.

Two Pigeon Guillemots flew on to the rock several times and several others swam amongst the kelp off shore. We were unable to find either eggs or downy young.

Cygnus columbianus. WHISTLING SWAN.

A considerable migration of whistling swans took place during the latter part of October, 1924, reports of their occurrence in numbers being received from districts where swans had not been observed for many years. A still larger migration was reported from points on the mainland coast, notably at Sea and Lulu Islands, where the total number was variously estimated at from two hundred and fifty to eight hundred individuals.

Cygnus buccinator. TRUMPETER SWAN.

It has been known for some years that a band of Trumpeter Swans winter regularly on a group of lakes on Vancouver Island, and in recent years a Migratory Bird Warden has been detailed to guard these birds. No casualties have been reported since this special protection was instituted. During the past five years the number of birds in the flock has varied from six to eighteen, but last winter (1924-25) the band numbered twenty-eight—fourteen adults and fourteen cygnets*. The lake most favoured by the swans is at an altitude of eight hundred feet above sea level from which it is distant about thirty miles. Of the type characteristic of Vancouver Island, with cold, deep, clear water, it is hemmed in by steep mountains covered with dense coniferous forest. Red cedar predominates along the lower levels and meets willow thickets and alder at the water's edge. The chief feeding ground is a shallow lagoon lying in a wide, marshy flat upon which is an almost impenetrable growth of willow and alder. This lagoon is fed by a small creek with sufficient current to ensure open water over the feeding ground even during cold winters where the lake itself freezes. Splatter-dock, *Nymphaea*, grows luxuriantly and in the summer the broad, fleshy leaves cover much of the surface with an over-lapping pattern. No doubt the large seeds of this plant are an important item in the winter diet of the swans. Other water plants such as milfoil and various potamogetons do not make vigorous growth, possibly because of the low summer temperature of the water.

In the summer of 1919 a pair of Trumpeter Swans nested on the shore of this lagoon and raised two young. It has been reported that one of the pair was crippled and, being unable to leave its wintering ground, induced a mate to remain behind and breed—a story denied by the lucky discoverer of the nest who states that the crippled

bird had been shot the previous year. This man accompanied me on a trip to the lake several years ago and pointed out the spot where the nest had been situated, on a sandy point, surrounded by willows, at the junction of two arms of the lagoon. He told of paddling his canoe past the sitting bird within a few yards on numerous occasions and at the same time noting the mate on the water a short distance away. Later in the summer, he several times saw two downy young accompanied by one or both parents.

Early in November, 1924, two adult Trumpeter Swans alighted on Beaver Lake, part of Elk Lake Game Reserve, near Victoria. On this secluded lake, screened from observation by thick forest growth, these birds tarried until a severe cold spell—December 15th to 26th—covered the lake with ice and forced them to visit the larger, adjacent, Elk Lake, where they remained until February 27th, usually frequenting the marshy south shore, in plain view from the West Saanich Road. Sometimes they could be seen feeding—with long necks submerged the entire length, perhaps dredging for the fallen seeds of the abundant yellow pond lily—but more often standing motionless in the shallows or asleep on the water at a safe distance from shore, with head and neck folded neatly over the back. Frequently I stalked them, screened for a greater part of the distance by thick brush, but could not get closer than one hundred and twenty-five yards. Once I had left the cover they sighted me at once and paddled out two hundred yards or so, there to turn and swim slowly back and forth parallel with the shore. On one occasion, after I had made a long stalk, and taken a number of pictures, both birds rose slowly, with much splashing, and flapped low over the water to the opposite shore, but generally they showed no particular alarm on being approached.

Usually while swimming the neck is held rigidly at right angles to the body, but at times there is a swaying movement forward and back in unison with the paddle stroke; the latter made visible by the regular appearance and submersion of the knobby heel-joint, so conspicuous against the white flanks. This neck swaying was performed first by one bird then the other.

During two months acquaintance with these birds, not once was heard the famous "brassy trumpet call" so often referred to in literature—nor have I heard it elsewhere—in my experience the Trumpeter Swan has been a relatively silent bird. Occasionally a three note call was given, the first two, slightly guttural, being introductory to the third, which is a sustained composite note, first deep and mellow, then rising crescendo—this with great carrying power but seemingly no louder

*That a slight increase has taken place in other bands wintering on the mainland is thought worthy of record also, as indicating a hopeful future for this magnificent bird.

at two hundred yards than at half a mile. Syllabifying bird voices is most unsatisfactory and the results usually intelligible only to their author so the following is submitted with apologies: *ugh-ugh-aw-r-r-r-r-h*. Sometimes the last composite note is given without introduction, at other times the introductory *ugh* is uttered four or five times in succession without the culminating sustained note. To me, the performance resembles Canada Goose talk on a magnified scale.

Gallinago delicata. WILSON'S SNIPE.

Wilson's Snipe were fairly abundant during the past winter (1924-25) and in the cold weather of late December a number congregated about a ditch containing a little open water supplied from the Colquitz Pheasant Farm. Through the interest of Game Warden Cummins, in charge of the Farm, it was possible to band nine of these birds. Mr. Cummins captured them without difficulty by simply placing, over a portion of the ditch, a partridge net into which the birds walked at dusk.

Accipiter cooperi. COOPER'S HAWK.

Abundant during migration, much less common in winter and a scarce breeder. Two immature males were taken in quail traps on January 28th, 1925. One had torn to pieces six captured quail but no part of the birds had been eaten; the other had been attracted by an Oregon Towhee, the only bird in this particular trap. This had been killed and eaten.

Astur atricapillus. GOSHAWK.

During October and November, 1925, a considerable migration of immature birds occurred and seven specimens were secured. None of these are as saturated as Queen Charlotte Island birds, but

average darker than those from the interior of the Province.

Zonotrichia coronata. GOLDEN-CROWNED SPARROW.

Perhaps the commonest *Zonotrichia* during migration and probably a regular but scarce winter resident. Specimens were banded on the following dates: immature in first winter plumage, November 20th, 1924; adult female, December 31st, 1924; adult female, January 27th, 1925.

Passerella iliaca. FOX SPARROW.

While banding Fox Sparrows in the Victoria region during the winter of 1924-25, two distinguishable races were encountered, viz: *sinuosa* and *townsendi*; specimens sent to Mr. Harry S. Swarth being so determined. The very dark breeding race *fuliginosa* was not observed. *Sinuosa* was found to be the common wintering race of this region, while *townsendi* was comparatively scarce and first appeared during the cold spell before referred to in this paper. Thirty-four specimens of *sinuosa* were banded between November 9th, 1924, and January 9th, 1925, and six specimens of *townsendi* were taken during the same period. Only a small number repeated and usually only for a day or so following the initial capture. Valdez Fox Sparrow, No. 241716, banded on November 24th, 1924, and recaptured on January 9th, 1925, was an exception.

Pipilo maculatus oregonus. OREGON TOWHEE.

While winter banding in the Cedar Hill District the Oregon Towhee was taken in about the same numbers as the Fox Sparrow and frequently both species were found together in the same trap. Thirty-one specimens were handled between November 9th, 1924, and January 31st, 1925. This is recorded merely to indicate the relative abundance of this species in winter.

ANOTHER INVASION OF CANADA

By HENRY HOWITT



IN OCTOBER, 1921, a neighbour in Guelph, Ontario, with whom I had been hare shooting several times in that vicinity, persuaded me to spend a day with him hunting what he called "big Jacks" near Galt, which is about fourteen miles distant.

We started before dawn in a motor-car with two black, white and tan hounds about eight months old, Nip and Tuck by name, a cross between fox-hound and beagle, of the well-known "harrier" size and type. That season they had proved their ability to tongue the trail of the native hare (*Lepus americanus*), but they were now to match their wind and wits against a much larger and faster quarry.

My neighbour was armed with a sixteen gauge, double-barreled, hammerless, Ithaca gun, and I with a twelve gauge of the same style and make. We carried number four and five shot shells.

Arriving in Galt shortly after daybreak, two friends joined us there with another car and two more hounds of the same useful size. We motored to the Township of Beverly, in Wentworth County about ten miles south-east of Galt, and picked up another hunter at a farm on the way.

Leaving the cars on the side of a road, we took to the fields about seven o'clock, the dogs ranging in front, and we slowly walking in a line extending to right and left, each man keeping about one hundred yards distant from the next, but with his

eyes on the dogs, lest they should show any of the usual signs of picking up a scent. The grass was faded brown and about eighteen inches long. Before we had crossed the first field there was a rapid "Bang! Bang!", and one of my companions ran to a fence corner and picked up something from the ground. It was the largest hare I had ever seen, nearly three feet long from the toes of the front feet to those of the hind, and the body large and heavy, of typical hare shape, the hind legs much longer than the fore, and the tips of the long ears black. It was white underneath, but elsewhere, except the black ear-tips, a mixture of light grey and fawn suffused with reddish brown in parts, but with many of the hairs tipped with black, the result being a protective coloring which blended perfectly with the dead grass of the fields. It had escaped the notice of the dogs for the moment at least, and had sprung from the grass where it had been lying, and dashed away at remarkable speed, only when one of our line of hunters had approached within a few feet, but he, although somewhat startled by its sudden rush, had hit it fairly with one or both barrels.

We continued our slow march over fields, and fences, and another "big Jack" was bagged shortly afterwards. In the afternoon we were joined by two more men and more dogs from Galt, and that day the party shot eighteen "big Jacks", and three cotton-tail rabbits (*Sylvilagus floridanus*). We met two boys of about sixteen armed with single-barreled shotguns. They were dragging an enormous sack, made by ripping open four or five potato bags and sewing them together. In it were ten "big Jacks" they had shot that day without the aid of dogs.

Subsequently I have enjoyed many such healthful tramps afield in the cold, invigorating, autumn air and welcome sunshine.

"Big Jacks" are usually found in fields, although when chased by dogs they will often run through a wood, and from one wood across fields to another, possibly in an endeavour to get out of sight of the hounds, but I have never known one, when chased, to pause to hide in the shelter of the trees. To hit one which suddenly jumps up a few feet in front of you and rushes off like an express train requires more skill and coolness than to shoot a native hare (*Lepus americanus*) as it ambles leisurely along the aisles of cedar.

On one occasion, in the same Township of Beverly, if we had not walked out of it, a dog which was near me flushed a "Big Jack" in such a way that I could not shoot without endangering the dog. The "Jack", followed by the dog, got through a fence and ran down a road, and was there met by another dog which caught it alive and squealing like a baby.

I have never known a dog to run down a "big Jack", which soon leaves the dog far behind, but good dogs will stay on his trail, and I have heard their bugling die away in the distance and then grow louder and louder as the hare circled, as he often, if not always, does.

The first I shot was after he had made just such an immense circle. I could hear the dogs coming back, baying furiously and suddenly "Jack" came through a log fence not more than twenty-five yards away and straight towards me. I missed with the first barrel, and "Jack", perhaps fearing otherwise I might kick him, turned half left and I fired the second at his flank. Even then he kept running around in a circle of about eight feet in diameter with one hind leg broken and a large patch of blood on his side where more of the shot had struck, fired from a full choke, Ithaca gun, at a range of less than twenty-five yards! I had to kill him with a stick, much to the amusement of two of my companions who had come up too late and sat on a fence and laughed at my efforts. I told them they perched on the fence for fear the hare would bite them.

Another morning there were six of us in line crossing a meadow, and the dogs were behind. Through a gate at the far side of the field I could see across a second field, and from beyond it came the sound of dogs of another hunting party, and of a shot or two. Across the second field towards the gate and straight towards me raced a "big Jack"! I was on the extreme left of our line and waited until he was within about seventy-five yards, but dare not wait longer because our dogs were coming up from behind us and might spoil the shot. I dropped on one knee and fired. "Jack" turned to his left and ran down the front of our line. I let go the second barrel, and all the others fired both theirs, but "Jack" flew on his way, his speed undiminished, belly to the ground at every stride! Indeed he seemed to spurt at each "Bang!"

But what are these "big Jacks", where did they come from, and are they increasing in number?

From several reliable sources I have learned that they are descendants of common European hares (*Lepus europæus*) which, a year or so before the Great War, were imported from Germany by a German and placed on a farm near Brantford about eighteen miles south of Galt, and have been told the names of the man and the farm. He has long since disappeared. They are much larger than our native varying hare (*Lepus americanus*), and do not turn white in winter as the latter does. Neither do they burrow like our cotton-tail rabbit (*Sylvilagus floridanus*).

The neighbour with whom I first hunted them tells me they are exactly the same as the common

hares of Germany (*Lepus europæus*) which he has shot there many times.

A friend with whom I have discussed them was in Belgium during the late war, and, although he has never seen our "big Jacks", his description of the size, color, and habits of the hares he shot there is identical with that of our invaders. He described how a comrade and he, armed with rifles, would one stand at the edge of a wood while the other traversed a neighbouring turnip field until a hare sprang up and ran at top speed straight for the wood as it almost invariably did.

The last "big Jack" I shot was in Puslinch Township, Wellington County, but within half a mile of the Township of Nassagaweya in the County of Halton, on September 15th, 1924, and was chased by my beagle out of a cedar swamp and ran at full speed straight across the field where I was standing towards another wood about one hundred and twenty-five yards distant, but this time I knocked him stone dead with one barrel of number six shot at a range of about twenty-five yards.

I have never weighed "big Jacks", but a reliable butcher to whom two we shot were taken to be dressed tells me they weighed nine and thirteen pounds, respectively. They are not as tender to eat as cotton-tail rabbits (*Sylvilagus floridanus*).

As already narrated, in 1921 the nearest place we could find them was in Beverly Township, in Wentworth County, to which, if the above account of their origin be true, and I think it is, they spread from near Brantford in the adjoining County of Brant. By the fall of 1923 they had reached the next Township of Puslinch in the

County of Wellington, within four or five miles of the City of Guelph, and no Guelph sportsman or naturalist now need go far afield to find them. Have been told they have been observed in Oxford County, which touches Brant County on the other side.

On July 22nd, 1925, I was walking near Hanlon's Creek, about three miles south of Guelph. From beneath the close, low branches of a white cedar (*Thuja occidentalis*) beside the path, a "big Jack" hopped slowly along a few feet in front of me. I sat down and watched with the aid of field-glasses. Four times the big hare returned as if wishing to get back to the place it had left. It came so close to me as to put my eight-power glasses out of focus and, as I lowered them, was alarmed by the movement and circled to return again and again, but not so close as at first. I carefully searched beneath the cedar but the ground was dry and hard and I found neither nest, form, nor young.

Newspaper accounts state these hares have been seen in the County of Halton, which adjoins Wellington, and one excited sportsman told a reporter they had horns. Evidently he mistook the black ear-tips.

In spite of being much hunted, their love of the open fields, scorn of "holing up", and fondness for the same dress the year round, which renders them conspicuous in winter, they have spread across at least three townships in as many years, and one may imagine what a menace to agriculture they might become were it not for our glorious, frost-biting, sun-dazzling, snow-sparkling, Canadian winters which in large measure cut off their food supply.

LEAD POISONING IN TRUMPETER SWANS

By J. A. MUNRO



THE BAND of Trumpeter Swans that regularly winters in a bird Sanctuary of Western Canada, contained eight adults and eight cygnets upon arrival from the north in late October; this being an increase of six over the previous year. About the middle of December a spell of unusually cold weather froze the lake and river mouth-where these swans were accustomed to feed. Because of this, they were forced to leave the Sanctuary and seek new quarters to the north on the open waters of a larger lake, part of the band selecting a sheltered and shallow bay near the south end of the lake and the remainder making headquarters some thirty-five miles farther north. Reports of their subsequent movements during the ensuing six weeks indicated a passing to and fro between

these two points. Both these localities had been visited at irregular intervals before the freeze-up and on one such occasion a swan had been shot. The persons implicated in the killing were convicted of the following offences committed on the same day, viz: killing a swan; having a swan in possession during the close season; killing a pelican and hunting migratory game birds from a power boat.

During the period January 22nd to February 12th, 1925, one adult and six cygnets died of an acute complaint which later was determined as lead-poisoning. The first victim, a male, was picked up on the lake beach and forwarded to the Provincial Museum at Victoria, B.C. The other six birds were found either dead or in a dying condition, and it was reported by the Migratory

Bird Warden, who picked up three of the dying birds, that a condition of paralysis was noted in every case. Apparently the wings were first affected, then the leg muscles, and the helpless sick birds drifted with the waves until finally washed ashore where it was an easy matter to pick them up.

The specimen forwarded to the Provincial Museum was not available for examination in the flesh, but I was informed by Mr. G. A. Hardy, Assistant Biologist at the Museum, that dissection showed a congested condition of the proventriculus, which, from his description, was thought to be identical with that of the lead-poisoned Mallard figured by Wetmore in Bulletin No. 793 of the United States Bureau of Biological Survey.

The remaining six specimens—one adult female, four immature females, and one immature bird not sexed—showed in each case the following indications of lead poisoning, viz: Entire liver stained dark green; discharge of dark green fluid from mouth; diarrhoea, the excreta stained dark green; flaccid cloaca and anus, enlarged four times natural size. Stomach contents of the specimens first obtained were not examined, the viscerae being sent intact, for pathological study, to Dr. E. A. Bruce, Animal Pathologist, and unfortunately, owing to a miscarriage of my explanatory letter, this material was not examined at the laboratory for traces of lead poisoning. In this connection, and in reference to a specimen later obtained, Dr. Bruce reported as follows:

"I am of the opinion that these birds died from lead poisoning, a fact that might have been ascertained or suspected at an earlier date but for the fact that a letter of yours with the Victoria date mark of the 8th, did not reach me until the 18th, by which time some of the material you forwarded me had been destroyed. Without the letter in question I had no information as to location of birds, symptoms or any suggestion that poisoning might be the cause. No particular attention was therefore paid to the contents of the gizzard; parasites were searched for with negative results insofar as being the cause of death was concerned, it being remarkable how free from worms these birds were, only three specimens being found from two sets of viscera.

"Later, the gizzards in question having been burnt in a wood fire, the ash was examined for the gizzard slag, which was then tested for lead with positive results.

"The positive test for lead in the slag mentioned confirms the findings made in material secured from a dead swan found buried at Summerland on the 20th. In this bird 451 shot were found (all in the gizzard with the exception of one in the duodenum and a few in the proventriculus which probably reached there through handling); the shot were, I judge, mostly No. 6, some very much worn, and weighing 17 grams. In

addition, some shot, possibly 30, were spilt in the carcass when eviscerated. A positive test for lead was secured from the liver and kidney. Reinsch test for arsenic was negative, but in view of the fact that shot contains a little arsenic, it is probable that arsenic might be demonstrated by a chemist.

"Lead poisoning is further indicated by the kidney, which shows on section a diffuse nephritis, and by the blood which indicates anaemia. Although I have no normal counts of swan's blood to go by, it is quite evident that the number of red cells is greatly reduced, and many of those present are young forms. Polychromasia is in evidence, but the basophilic granules commonly found in red blood cells of mammals suffering from lead poisoning, were not noticed (this was remarked by Wetmore). The liver was stained green throughout and the gall bladder full of thick bile. On section the liver shows bile stasis and some necrosis. All three gizzards examined were full and their contents stained green; all showed some loosening and erosion of the pads. The proventriculus in one case contained a little food, the other two were empty.

"The intestines show evidence of irritation and in places a little inflammation; the mucous surface covered with catarrhal exudate and the contents greenish in colour and fluid, the latter being particularly noticeable in the cloaca. The vent flabby, and the caeca apparently normal except that some of the contents were greenish in colour."

This is the first instance of lead-poisoning in waterfowl that has been reported from the district, where it is probably of rare occurrence. To account for the heavy mortality from this cause amongst the valuable Trumpeter Swans the following theory is offered.

Trumpeter Swans have frequently been observed feeding, or perhaps taking sand, in water from two to three feet in depth, and this is thought to be a constant habit. The feeding grounds which the swans frequented after being driven from their sanctuary comprise areas where duck shooting and to some extent, trap shooting, has been practised for many years and no doubt a large amount of shot is buried in the sand at the bottom of the lake, the greatest amount probably having been deposited at the limit of shot range from the shore. In these particular areas the depth of water at this distance from shore is that at which swans are accustomed to feed and, therefore, these birds would be more liable to pick up pellets of shot than would the diving ducks in feeding farther out in the lake or the pond ducks in feeding along shore. It may be remarked in this connection that no sick ducks have been reported and, as the beaches were being patrolled, any such casualties would probably have been noted.

On February 12th the remainder of the flock, six adults and two cygnets, appeared on a small opening in the ice at the mouth of the River where

it enters their lake sanctuary and feeding ground. Whether these birds were affected is not known, but no further casualties occurred. When Dr. Bruce and I examined them, through 8X binoculars, on February 20th, all seemed in good

condition and took flight when approached from the shore. Later a number of faeces were collected along the edge of the ice and these Dr. Bruce considered normal.

EXTRACT FROM—
“FOREST INSECT CONDITIONS IN NORTHERN ONTARIO”

By M. B. LUNN

Read at a meeting of the Entomologists' Group, Professional Institute of the Civil Service, March 6, 1925.



HE WORK of woodpeckers is undoubtedly one of the major facts in the control of the Spruce Bark-beetle, *Dendroctonus piceaperda*. Only occasional trees are entirely overlooked by the birds, and in these immense numbers of beetles mature. Woodpecker work is apparently begun when the larvae are about half-grown and carried on systematically from then until the remaining beetles emerge in the spring. On trees infested in June, woodpecker work commences about the middle of August and probably reaches its height during winter. The species of woodpeckers observed at work are the Northern Pileated, Hairy and the Arctic Three-toed; the Downy Woodpecker is also abundant in this district but has not been observed on *Dendroctonus* trees.

When heavy woodpecker work takes place approximately all the brood is either eaten or knocked off the tree in the scales of bark scattered by the bird. The Pileated and Arctic Three-toed pry off the bark in flakes to a considerable extent riddling the remainder with holes. If in the larval or pupal stage, the mortality from exposure and abnormal conditions is undoubtedly complete among individuals thus knocked off the tree, while, unless the young adults are nearly ready to emerge, and the weather is very favourable, a heavy percentage of these will die also. Young adults thus exposed in winter probably all die.

In heavy woodpecker work on a standing tree, July-August, 1923, infestation, the following numbers of young adults were found to have escaped the birds:—

5 in one brood	20 in one brood
7 “ “ “	5 “ “ “
3 “ “ “	12 “ “ “
1 “ “ “	6 “ “ “
20 “ “ “	4 “ “ “
Total.....	83

In this tree (No. 5), there were approximately the following numbers of tunnels:—

- 146 successful tunnels in butt log (16 ft.) and stump;
- 49 drowned-out tunnels in butt log (16 ft.) and stump;
- 9 successful tunnels in upper log—16 ft.

116 drowned-out tunnels in upper log—16 ft. In the whole trunk only about five hundred beetles were left from the whole tree.

On October 11, a 15-inch d.b.g.* tree of the June 1924 attack, which had been subject to heavy woodpecker work, was cut, the bark carefully removed in small sections, and a count made of the remaining larvae, pupae and young adults. The total number of successful tunnels in the tree were also counted; the result being as follows:

Total number of tunnels in 28 feet of infested trunk.....	982
Total number of larvae, pupae, and young adults remaining in tree.....	6368
Parasitised or diseased larvae.....	98
Clerid larvae present (in only one instance were these found actually feeding on beetle larvae).....	21

Assuming that at least one hundred eggs (a low estimate) were laid in each successful tunnel, theoretically over ninety thousand insects should be present in the tree. Heavy mortality among the broods was, however, doubtless due to other causes than woodpeckers. Due to the very short distances between the adult tunnels, overcrowding of the larvae with consequent starvation probably accounted for large numbers of them. One strip of bark, with an area of one square foot, was found practically untouched by the birds. Under this were found two hundred and fifty beetles. Had there been no woodpecker work in this tree, which had an approximate area of eighty-eight square feet of infested surface, there would thus apparently have developed about twenty-two thousand beetles. It seems a reasonable assumption, therefore, that upon the date of examination the destruction of almost three-fourths of the total brood likely to emerge can be credited to the work of the woodpeckers. Since the birds were feeding on this tree at the date of cutting, in fact fed upon the upper portion of the log at the actual time that counts were being carried out on the lower, and normally feed on *Dendroctonus*-infested trees throughout the winter, no doubt a considerable proportion of the remaining insects would have been destroyed by the birds.

*d.b.g.—Diameter, breast, high.

THE EUROPEAN GREY PARTRIDGE IN THE OKANAGAN VALLEY,
BRITISH COLUMBIA

By J. A. MUNRO



IN THE winter of 1917-18, a European Grey Partridge, which had been killed near Summerland by flying against a telephone wire, was sent to me in the flesh for identification. As far as known, this species had not previously been recorded in the Okanagan Valley and at the time was unknown to local sportsmen.

During the next three years several small coveys became established—the furthest outpost being at Crescent Beach, near Summerland—and their number steadily increased. Since then has occurred a rapid extension of range northward and a phenomenal increase in the number of individuals. So far, the most northerly point reached is Salmon Arm, approximately 175 miles north of the State of Washington, from whence came the original stock. It is understood that no birds have been released in this district on the Canadian side of the international boundary.

This hardy bird evidently finds conditions in the dry-belt of British Columbia entirely to its liking, and I am of the opinion that in another decade it will outnumber all the other species of Upland Game birds combined, including the introduced Mongolian Pheasant, which, by the way, is also in a flourishing condition.

In the Okanagan Valley, the habitat of the Grey Partridge embraces not only the *artemesiae*

association, where it first became established, but also the dry range land of *Pinus ponderosa* to at least 4,000 feet altitude and, of course, the cultivated lands on bench and river bottom. It is interesting to compare the history of the species on Vancouver Island and the Fraser River Delta where introductions were first made perhaps twenty years ago. Although birds have been liberated at various times since, little invasion of new territory is recorded and only a nominal increase has taken place—a condition that perhaps may be ascribed to unfavourable climatic conditions. Here, cultivated fields and meadow lands are frequented almost entirely, the heavy coast forest offering no attraction.

In the summer of 1924, complaints of damage, caused by this species, to the melon and tomato crop in the southern Okanagan were received by the Game Conservation Board of British Columbia, and the economic status of the Grey Partridge became a question of importance. Four specimens, taken at Osooyos and Oliver, were secured by the Secretary of the Board and sent to me for the purpose of stomach analysis, the results of which are shown in the following table.

For assistance in the identification of seeds I am indebted to Professor John Davidson of the University of British Columbia.

STOMACH CONTENTS OF FOUR EUROPEAN GREY PARTRIDGE
TAKEN IN THE SOUTHERN OKANAGAN DISTRICT, BRITISH COLUMBIA

Sezand No.	Date and Hour	Locality	Condition of Stomach	Contents
203	Aug. 17/24	Oliver, B.C.	$\frac{1}{4}$ full	17 seeds, <i>Chenopodium</i> (album?); 100 (est) unidentified seeds of one species; small quantity comminuted vegetable matter not identified.
♂ immature	11.00 A.M.			Vegetable matter.....50%
204	Aug. 17/24	Oliver, B.C.	$\frac{1}{3}$ full	Sand and Gravel.....50%
♂ immature	11.00 A.M.			100 (est.) seeds <i>Echinochloa crusgalli</i> , the majority in fragments; 9 seeds <i>Setaria glauca</i> .
205	Aug. 19/24	Osooyos, B.C.	$\frac{1}{2}$ full	Vegetable matter.....40%
♂ immature	12.05 P.M.			Sand and Gravel.....60%
206	Aug. 19/24	Osooyos, B.C.	full	53 seeds <i>Chenopodium</i> (album?); 150 (est.) unidentified seeds (same species as in No. 203); small quantity indeterminate vegetable matter.
♂ adult	12.05 P.M.			Vegetable matter.....50%
			full	Gravel.....50%
				CROP: 3 leaves <i>Medicago sativa</i> ; 52 seeds <i>Chenopodium</i> (album?); 112 seeds <i>Polygonum</i> (sp?); 11 seeds <i>Stipa</i> (sp?); 3 grasshoppers (sp?);
				Vegetable matter.....60%
				Insects.....40%
				STOMACH: 21 seeds <i>Polygonum</i> (sp?); 104 seeds <i>Chenopodium</i> (album?); 5 (est.) seeds of <i>Stipa</i> (sp?) in fragments; 51 seeds <i>Rhus glabra</i> ; small quantity comminuted vegetable matter; 1 whole grasshopper (sp?); fragments of several others.
				Vegetable matter.....40%
				Insects.....35%
				Sand and Gravel.....25%

An opinion regarding the local food habits of the Grey Partridge formed on such scanty material would have slight value, yet this study does suggest a possibility of its relations to agriculture being beneficial. With the exception of three

alfalfa leaves found in one stomach the identified vegetable content, while including seeds of neutral value such as sumach, consisted chiefly of noxious weed seeds. The destruction of grasshoppers indicated by the analyses, may be of economic

importance. Possibly the Grey Partridge will prove a control factor of value in this district which is subject to periodic invasions of these insects, perhaps, in this respect taking the place

of the Sharp-tailed Grouse, now greatly reduced in numbers in the southern portion of the Okanagan Valley.

BARE ISLAND, BRITISH COLUMBIA

By J. A. MUNRO



BARE or Ridge Island, forming Reserve Number 9 of the Saanich Indian Tribe, is situated in Haro Strait about five miles east of the village of Sidney on Vancouver Island. The island is approximately a half-mile long, two hundred yards wide, and contains twenty-six acres more or less, most of which is rock. The west side is mainly precipitous from the central ridge which has a maximum elevation of approximately two hundred and fifty feet. The more gradual slope to the east shore is covered with soil and supports a growth of various wild grasses, Kamas or wild onion, vetches and other flowering plants. The hollows where the soil is deeper are covered in places with a dense growth of wild cherry, willow, etc., some of which reach tree size, while one small group of Douglas fir and several madronas stand out prominently against the lesser growth. There is no arable land on the island and no fresh water.

The following observations were recorded under date of May 14th, 1921, and July 23rd, 1923, when the Island was visited in connection with the enforcement of the Migratory Birds Convention Act.

PIGEON GUILLEMOT—*Cepphus columba*.

May 14th, 1921.

It was estimated that forty pairs were present, flying in pairs about the island or else resting in small bands on the water close to shore. Some of the latter were performing their mating actions which, as far as observed, consisted of a short rapid flight led by the female with the male in close pursuit, followed by a quick dive, both birds striking the water about the same time to continue the pursuit beneath the surface. No occupied burrows were found and it was evident that egg-laying had not started. Many burrows have been usurped by the Belgian Hares, which were introduced on the island some years ago.

July 23rd, 1923.

With a tameness peculiar to the breeding season a number of Guillemots sat about on the rocks close to the water's edge and allowed us to approach within a few yards. Their bright red feet, conspicuous against the grey rocks, were almost as much so when the birds were in flight, for, carried straight out behind, they appeared all

scarlet stripes on either side of the short tail. Small bands rode on the gentle swell two hundred yards or so from shore, others swam amongst the kelp closer in and a constant passage of birds took place back and forth from the rocks to the sea. In the short time at my disposal, it was not possible to spend much time in hunting for nests which are more difficult to find than those of the gulls. Five nests containing the quota of two eggs were found, also a number of crevices that showed signs of being occupied. The colony was estimated to contain one hundred and fifty pairs but only a small percentage had commenced laying. The remains of several eggs, which had been eaten either by crows or gulls, were found on the summit of the island. The breeding crows have all been killed but a few bold marauders still visit the island, in constant peril from the twelve-gauge of the warden.

GLAUCOUS-WINGED GULL—*Larus glaucescens*

May 14th, 1921.

It was estimated that seven hundred individuals were congregated on the island, either standing on the rocks, which were splashed with their droppings, or in the grassy hollows. These, with the exception of three second-year birds which evidently were visitors, were fully adult. All appeared to be mated and were associated in pairs but nest-building had not started. A close approach was not allowed and the birds when thus disturbed circled over our heads screaming continuously, and then flew to some other part of the island or else settled on the water a short distance from shore, there to rest until we had passed on, when they would shortly return to what was evidently their selected nesting sites.

July 23rd, 1923.

The first close-up of the island revealed the gulls, hundreds of them, snowy white against the grey weathered rocks. When we landed and walked along the summit of the island, all the nesting birds for seventy-five yards ahead of us rose in the air and circled about the cliff or flew a short distance out to sea. Soon after we had passed, they returned to the vicinity of their nests and the bolder individuals settled on the rocks twenty yards or less behind us. During our walk along the island, part of the colony was always in

the air. The wheeling birds went through their varied repertoire of calls, some musical, some harsh, but rarely did those standing on the rocks utter a sound. On the whole, there was relatively less noise in this breeding colony than would be made by a flock of feeding gulls.

The short turf that grows in all the pockets of this great rock has been burnt dry and yellow in the summer heat and the stalks of wild onion, with their clustered seed-pods, are dry and brittle. On these open portions of the island is little colour to relieve the neutral grey of the rocks and the seared yellow of the turf save an occasional green willow. All the turf patches are white with gull feathers and the dry grass is trampled flat by the feet of many birds, the projecting rocks—favorite roosting places—are painted with droppings. Amongst the debris accumulated by this thriving colony were found the shells of various molluscs and sea-urchins of different sizes—the remains from countless feedings. Here and there also were castings of crab-shells and fish-bones. Nests were found everywhere, and as the eggs were inconspicuous, one had to walk warily. Many nests in the exposed patches of turf were unprotected from the full glare of the sun, others were built close to the shelter afforded by a projecting rock, while a few were more or less concealed by clumps of withered vegetation. On the cliff face itself, wherever there was a grassy ledge, one or more nests were found and practically every sheltered crevice was occupied. Each was like its fellow—a slight hollow lined with tufts of dry grass to which the small roots were still attached. It was noted that nests built on the bare rock had been furnished with a thicker lining of grass than those built in the turf. Five clutches of four eggs were found—no doubt the work of two females in each case—but the greater number of nests held three eggs and others only two or one. A con-

siderable difference in the size and shape of the eggs and a great variation in ground colour and markings was apparent. A few clutches of three included one egg on which the pigmentation was nearly obscured by a light grey wash. Occasionally with clutches of eggs of the greenish grey type were single eggs of a warm brown ground colour, heavily blotched with dark umber—probably contributed by a different female. We examined about two hundred nests and it was thought these represented one-third of the colony. One gull was incubating eggs thirty feet from the warden's tent.

VIOLET-GREEN CORMORANT—*Phalacrocorax pelagicus robustus*

May 14th, 1921.

Two bands, estimated at thirty all told, were seen. Apparently none were mated. Indications pointed to their having nested in former years on the rock cliffs at the north-west corner of the island.

July 23rd, 1923.

Cormorants are nesting in their usual colony on the steep cliff at the north-west end of the island. As we walked to the edge of the cliff, the sitting birds flapped out from nests that were invisible below us on the undercut rock. To our right as we faced the sea, a slanting chimney led to a rough ledge on which were built two nests, and above these, on what seemed most precarious foundations, were two others; all held their quota of greenish-white eggs—conspicuous objects against the dark wall of rock. From one of these nests a sitting bird, thought to be a female, was seen departing at close range. She did not fly out with the other members of the colony, but rose on her feet and remained straddling the eggs with long neck curved in our direction. For a few seconds only she hesitated, then carefully slipped off the nest and took wing.

PASSENGER PIGEONS

By WILLIAM WELSH
Kincardine, Ontario

A Bruce County pioneer over eighty years of age.



IN THE month of May, in the year 1854, we were landed from a small rowboat on the shore of Lake Huron. We had with us only a few chattels with which to start house-keeping in the wilds of Bruce County. The spot at which we landed was near Pine river, a mile or so north of Point Clark.

It was about 3 o'clock in the morning when the boat put us ashore, and as day dawned we saw our surroundings, beautiful in their untrodden grandeur. The clean, pebbly beach showed little

sign of civilization. Even the logs and drift-wood bore neither mark of axe nor saw, but were just as they had been torn from spots where nature had planted them. We could see the beautiful, native pines appearing in rows, as if planted by man. This was owing to the fact that the wooded sand dunes ran parallel with the shore.

As the day wore on, the pigeons surprised us, they came in such large numbers. But this seemed accountable because of the enormous crop of beechnuts of the previous year, and as the clay

land was covered in places with beech and maple it was a grand feeding ground. Where the pigeons came from we could not surmise, but still they came, and all in good condition. Evidently they were coming from the south, where the winter had been spent.

A person, who has not seen these flocks of pigeons, cannot comprehend the enormous numbers flying overhead and continuing for days. They were often so low that guns, stones and sticks were used to knock them down; pigeon soup or pigeon pie was often part of the frugal fare of the settlers. These birds always flew in flocks of hundreds or thousands and to even count the flocks visible at one time was impossible. Standing on the lake-shore, I have seen the flock at times following one another so closely that at least one third of the space seemed filled with pigeons, and this would continue for days. In later years, as the clearings were enlarged, I have seen a flock of hundreds light in a wheat field, with the result that the crop was soon a dead loss. They were, however, easily frightened away. Often the birds would perch on trees in such numbers as to break strong limbs with their weight.

There was no care taken in preserving this quiet, harmless innocent bird; the white man was even worse than the Indian in destroying it. While the Indian looked to its food value, the white man thought often only of the sport of killing.

What calamity caused the disappearance of such myriads of birds is not known, but the Passenger Pigeon is now extinct. Whether they were destroyed by disease or whether extensive snowfalls

or cold weather overwhelmed them is not certain. Hawks could often be seen in the flocks and owls must have had good hunting, picking them off at night. The Blue Hawk was then plentiful and easily distinguishable in the flocks. I have seen this bird catch a pigeon in direct flight. This we cannot wonder at when we consider the relative speed of flight of these two birds. It is estimated the Passenger Pigeon's flight is sixty miles an hour, the Blue Hawk's from eighty to one hundred and eighty, when taking a dive. Other animals, such as foxes, coons, minks, weasels and martens also aided in the destruction of the birds.

The Passenger Pigeon, like the domestic pigeon and Mourning Dove, laid only two eggs at one hatching. These eggs were laid on a platform of twigs worked into a suitable network. The chicks grew very quickly and in a few weeks were nearly as heavy as the parents. The young were then looked upon as dainties by epicures, and to supply this demand many were taken from the nests.

The pigeons built in communities and the extent of a pigeonry might be over a hundred square miles. There was one convenient to our farms, only about six miles away, and this was said to extend eleven miles in one direction and thirteen in another. I did not see any trees with more than twenty-four nests and there were others with perhaps twelve and some with not more than three or four. There was a continual noise when the birds were leaving their nests or returning to them. But this cooing was not disagreeable, although slightly plaintive.

We are not ever likely to see again such sights as the Passenger Pigeon has afforded us.

NOTES ON THE ECONOMIC RELATIONS OF KENNICOTT'S SCREECH OWL (*Otus asio kennicotti*) IN THE VICTORIA REGION,

By J. A. MUNRO



HE following data, based on an examination of the stomach contents of thirty Screech Owls are presented to illustrate how the feeding habits of this species may be affected by local conditions; this study, indicating a marked preference for insect diet on the part of the local race—a habit which certainly is not common to the species as a whole.

Specimens referred to in the accompanying table were taken in an agricultural district of intensive farming, where areas of low-lying bottom land, usually fringed with Sitka Alder, birch, willow and dogwood, are separated by low, rocky knolls covered with Madrona, Garey oak, Douglas fir and Jack pine—both associations being penetrated by the introduced broom. As much of this district has been under cultivation for over

thirty years, its ecologic factors may be considered fairly stable.

It will be noted that numbers 174, 175, 178, 179 and 182 are the only specimens in which bird-remains were found. These were taken, during a spell of unusually cold weather, in traps of the ordinary funnel type which were being operated at the Provincial Game Farms to capture quail. Small birds entered these traps quite frequently and sometimes, if captured after the evening inspection, were imprisoned for the night. Confined thus, they served to bait the traps for Screech Owls which, no doubt, were hard pressed for food, the ground being frozen and insects dormant. It may be added that Saw-whet Owls were captured under the same conditions.

One point of note is: The pellet of mouse-hair

in stomach No. 190 was the only evidence obtained that mammals form an item in the diet of the local Screech Owl. Small mammals are poorly represented on Vancouver Island; those occurring locally being Vancouver Island Squirrel, Puget Sound White-footed Mouse, Vancouver Island Meadow Mouse, Vancouver Island Shrew and the introduced Norway Rat and House Mouse, both

free-ranging species in this district. Few opportunities for capturing the diurnal squirrel would occur and shrews, it is believed, are rarely eaten by owls and perhaps should not be considered in this discussion. But there remain four species, all present in fair numbers, and yet apparently seldom molested by the commonest raptore in the district.

STOMACH CONTENTS OF THIRTY KENNICOTT'S SCREECH OWLS TAKEN IN THE VICTORIA REGION,
BRITISH COLUMBIA

No.	Date	Sex	Condition of Stomach	Contents
189	Jan. 14/25	Male	Distended	6 noctuid larvae; fragments of large earth worm; quantity of earth mixed with fragments of dry grass and rubbish.
190	Jan. 14/25	Male	Distended	5 noctuid larvae; fragments of two earth worms; 1 small pellet of mouse hair quantity of miscellaneous rubbish, chiefly dead grass and earth.
201	Feb. 16/25	Male	$\frac{1}{2}$ full	A pellet composed of minute fragments of insects (noctuid larvae?) mixed with earth.
115	Feb. 24/24	Female	$\frac{1}{4}$ full	A pellet containing fragments of thorax and elytra of carib beetle mixed with fine sand and indeterminate matter.
209	Mar. 9/25	Female	$\frac{1}{4}$ full	Paste of comminuted insect remains (noctuid larvae?) and earth.
123	Mar. 10/24	Male	$\frac{1}{2}$ full	A pellet containing fragments of elytra and tarsi of carib beetles mixed with earth
124	Mar. 11/24	Male	$\frac{1}{2}$ full	Small quantity of earth and fragments of carib beetle.
125	Mar. 18/24	Male	$\frac{1}{2}$ full	Small fragments of carib beetle.
55	Mar. 21/22	Male	Distended	Remains of approximately 80 noctuid larvae.
127	Mar. 21/24	Male	$\frac{1}{2}$ full	Fragments of elytra and tarsi of carib beetles.
128	Mar. 24/24	Female	$\frac{1}{2}$ full	Fragments of elytra and tarsi of carib beetles.
61	Mar. 25/22	Male	Distended	Remains of approximately 60 Noctuid larvae.
129	April 1/24	Male	Full	25 noctuid larvae (Euxoa?).
63	April 26/22	Female	Distended	Approximately 65 noctuid larvae.
133	May 14/24	Male	$\frac{1}{2}$ full	Fragments of elytra and tarsi of carib beetles.
139	June 24/24	Juv. Fem.	$\frac{1}{4}$ full	Integuments of 3 lepidopterous larvae.
142	Aug. 21/24	Im. Male	Full	Fragments of carib beetles.
143	Aug. 21/24	Female	$\frac{1}{2}$ full	Fragments of carib beetles.
144	Aug. 21/24	Im. Male	Full	Fragments of carib beetles.
145	Aug. 22/24	Female	Full	Fragments of elytra and tarsi of carib beetle; portions of one cricket (orthoptera).
146	Aug. 23/24	Male	Full	Fragments of carib beetles.
147	Aug. 26/24	Im. Male	$\frac{1}{4}$ full	Quantity of insect eggs (lepidoptera?) mixed with earth and indeterminate matter.
148	Aug. 27/24	Female	$\frac{1}{2}$ full	Remains of 3 crickets and 1 grasshopper (orthoptera); elytra of 5 carib beetle (carabus taedatus); elytra of 4 small black carib beetles.
161	Nov. 9/24	Male	Nearly Empty	Comminuted matter (insects).
162	Nov. 9/24	Male	$\frac{1}{2}$ full	Elytra of carib beetles and indeterminate matter.
174	Dec. 9/24	Female	Distended	Remains of two Fox Sparrows.
175	Dec. 9/24	Male	Distended	Pellet containing bones and feathers of Junco.
178	Dec. 23/24	Female	Distended	Remains of Fox Sparrow and Oregon Towhee.
179	Dec. 23/24	Female	Distended	Remains of Fox Sparrow.
182	Dec. 29/24	Female	$\frac{1}{2}$ full	Pellet of Junco feathers.

SUMMARY

A study of the stomach contents of thirty Screech Owls taken during nine months of the year in the Victoria region, British Columbia, suggests that:—

1. The local race shows a marked preference for an insect diet. Species of insects belonging to the genera of Lepidoptera and Orthoptera known to be destructive to agriculture were found in twelve stomachs and comprised forty percent of the insects eaten; the remainder being species of ground beetles *Caribidae*, believed to be chiefly beneficial to man.

2. The presence of bird-remains in stomachs should not be taken as evidence that the local Screech Owl is destructive of small birds because in these instances the birds were attacked under

abnormal conditions which no small owl could be expected to resist.

3. The four species of small mammals inhabiting the region are seldom eaten by screech owls even during the winter months when flesh-food would be expected to figure prominently in their diet.

The evidence submitted regarding the economic status of the local Screech Owl is by no means conclusive and possibly an altogether different story might be revealed by an intensive study of nestlings such as Dr. Allen conducted*. But it is considered that a marked predilection for insects is indicated when such fare is hunted during the relatively barren winter months when probably flesh-food could more easily be obtained.

*Allen, Economic Status of the Screech Owl. *The Auk*, Vol. XLI, pp. 1-16.

RADIO LECTURES—FALL 1924 TO SPRING 1925



OTTAWA is so well provided with lectures that it has long been difficult to secure large enough audiences to warrant the expenditure of time necessary to prepare an address. It was for this reason, and in part because of the inauguration of a comprehensive lecture course each winter by the authorities of the National Museum, that the Club has discontinued its time-honoured policy of holding series of Natural History lectures each winter. Radio offered the new possibility of taking the lecture to the audience, and the Council agreed to having a programme of lectures available furnished to each of the radio stations, CNRO and CKCO. Both these stations have co-operated admirably with the Club, and the members of the Club have given generously of their time to make the radio feature a success.

The first step was to secure a list of addresses from the members. This was promptly accomplished, and nineteen titles were furnished each of the two radio stations; the subjects being divided so that topics of more or less local interest were allotted to the less powerful station, CKCO. Sixty-one formal titles for lectures were soon made available. This start gave a large choice to the stations in preparing their programmes. It should be mentioned that the Club has held itself in readiness to furnish short talks on Natural History subjects other than those formally arranged in advance, and on the other hand the stations have always been ready to give announcement to events concerning the Club.

Radio station CNRO, the Canadian National Railways, Ottawa, has given a radio address under the auspices of the Club on practically every Saturday night from December 6, 1924, to April 18, 1925. This has been the general programme, including a great diversity of subjects, but in addition to it this station has often broadcast talks of more local and special interest, in which category belong the talks on "Birds of the Week". The general programme may be of interest to others called upon for similar Natural History endeavour, and for the purpose of record it is given here.

Dec. 6, 1924—"Totem Poles": Dr. E. Sapir.

Dec. 13, 1924—"The Earth and the Fullness Thereof": Miss A. E. Wilson.

Dec. 20, 1924—"A Day in an Eskimo Snow Hut": D. Jenness.

Dec. 27, 1924—"Ten Summers in the Yukon": Dr. W. E. Cockfield.

Jan. 3, 1925—"Sight-seeing along the Canadian National Railways in British Columbia": Dr. J. R. Marshall.

Jan. 10, 1925—"Canada and the Migratory Bird Treaty": Hoyes Lloyd.

Jan. 17, 1925—"Fishing and Hunting in the Gaspé Peninsula, Quebec": Dr. T. J. Alcock.

Jan. 24, 1925—"Prospecting in Manitoba": Dr. J. F. Wright.

Feb. 7, 1925—"Some Wild Animals You Should Know": Mr. Clyde Patch.

Feb. 21, 1925—"What We Owe to the Indians": Mr. W. J. Wintemberg.

March 4, 1925—"The Barren Lands Caribou": Mr. G. H. Blanchet.

March 7, 1925—"Shooting Birds with a Camera": Dr. R. E. DeLury.

March 14, 1925—"Geology in the Development of Mineral Resources": E. D. Ingall.

March 21, 1925—"Dinosaurs—the Real Giants of the Past": C. M. Sternberg.

March 28, 1925—"Bears in Canada's National Parks": Miss M. B. Williams.

April 4, 1925—"Dangerous Insect Invaders": Mr. L. S. McLaine.

April 18, 1925—"Mining Talcum": Dr. M. E. Wilson.

In connection with Dr. DeLury's lecture on "Shooting Birds with a Camera", the Club and radio station CNRO offered a series of twenty prizes to the boys and girls who wrote the best essays of a prescribed length re-telling the story in their own words. Many first-class essays were entered, and several interesting exchanges of correspondence resulted. One pleasing result was the donation of a camera to the competition by the boys of Connaught Public School, Ottawa. In giving this prize, the boys said that they had in mind three reasons, as follows: 1. They were all fond of birds; 2. They had built, and were building, bird houses; 3. They wished to help a good thing along. It was the writer's privilege, acting with Dr. DeLury, to personally present this prize to the boy who won it, and who came to Connaught School to receive his prize. The entire prize winner list was broadcast by radio and printed in the press.

The chief feature of the radio talks from station CKCO, the Ottawa Amateur Radio Association, has been the regular broadcasting of bird news and other natural history notes, under the title of "Birds of the Week". Occasionally, when the station CKCO could not utilize this feature, the CNRO station obliged the Club by transmitting these talks, thus preventing any serious interruption in their continuity, which is believed to be important in maintaining the public interest.

Since October 13, 1924, when this series was inaugurated, the following speakers have given the

number of addresses indicated: C. E. Johnstone, 4; H. F. Lewis, 4; C. L. Patch, 3; Hoyes Lloyd, 3; R. E. DeLury, 3; C. B. Hutchings, 2; W. E. Hurlburt, 2; N. Criddle, 1.

In addition to this series, Mr. N. Criddle spoke from this station on "Skunks", and Mr. H. F. Lewis gave a resumé of his address, "Canadian Sea Fowl", which was the feature of the 1924 annual meeting.

One follower of the radio lectures of the Club, Mr. D. Kemp Edwards, an Ottawa lumber merchant, gave to the Club some 1,500 bird-houses of kinds suitable for Robins, Tree Swallows, and Wrens. This splendid present was announced through station CKCO, and for several days Mr. Edwards' place of business was besieged by crowds of children, each wanting a bird-house. They were given to those who had a note from a parent stating that it would be put up in a suitable place. Each house was cut to pattern, and the child was given a printed sheet of instructions telling how to put it together.

Wide as is the range of influence from one powerful station, the influence of the addresses prepared

by members of our organization at Ottawa will have a still wider effect, for the officials of the Canadian National Railways have requested and received permission to broadcast these addresses from their eight other Canadian stations. The Club has co-operated with these officials as well in securing speakers for the radio stations of the C.N.R. system, which extend from Moncton to Edmonton.

The Club has used the radio also in an attempt to keep in touch with distant members. A message of instructions from several different Government Departments was broadcast from CNRO early Christmas morning, addressed to Mr. J. Dewey Soper, Pangnirtung, Baffin Island, N.W.T. There was included a personal greeting from Mr. Soper's family and a few words of good will and best wishes from his fellow members of the Ottawa Field-Naturalists' Club.

I hope that this account of the radio affairs of the Club has not been too wearying, but our results show that people are still willing to be attracted by Natural History and radio is one way of telling them of its charms.

OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS*

(Continued from page 122)

In the following returns upon banded birds, it will be noted that some returns may be thought to indicate, from the date of capture, violations of the Migratory Bird Act of Canada or the United States. The great majority of returns, which seem to indicate violations, are from birds accidentally caught in traps set for fur-bearing mammals, from birds caught in fish nets, killed by oil, or from birds found dead from unknown causes. Appropriate action has been taken in connection with the few returns which indicate illegal shooting.

HERRING GULL, No. 209,563, young, banded by Wm. M. Duval, at Bonaventure Island, Gaspé County, Quebec, on July 28, 1923, was shot at Castalia, Grand Manan, New Brunswick, about January 15, 1925.

CASPIAN TERN, No. 224,034, banded by F. C. Lincoln, at St. James, Michigan, on July 26, 1923, was found dead at Sand Point, Guysborough County, Nova Scotia, about October 14, 1924.

CASPIAN TERN, No. 224,175, banded by F. C. Lincoln, at St. James, Michigan, on July 26, 1923, was found dead at Upper Prospect, Nova Scotia, on August 28, 1924. The bird had probably died from starvation.

CASPIAN TERN, No. 224,192, banded by F. C. Lincoln, at St. James, Michigan, on July 26, 1923, was killed at Cape Morien, Cape Breton, Nova Scotia, on August 28, 1924.

DOUBLE-CRESTED CORMORANT, No. 232,115, young, banded by R. Lloyd, at Last Mountain Lake, Saskatchewan, on July 1, 1923, was killed at Lake Verret, Assumption Parish, Donaldson, Louisiana, on November 4, 1924.

MALLARD, No. 200,478, banded by L. V. Walton, at Cuivre Island, Missouri, on January 13, 1923, was shot at Oxbow, Saskatchewan, on September 4, 1924.

MALLARD, No. 203,355, banded by John Broeker, at Portage des Sioux, Missouri, on January 27, 1923, was killed at North Battleford, Saskatchewan, on September 18, 1924.

MALLARD, No. 205,375, banded by L. V. Walton, at Cuivre Island, Missouri, on February 23, 1923, was shot at Last Mountain Lake, Saskatchewan, on October 29, 1923.

MALLARD, No. 205,377, banded by L. V. Walton, at Cuivre Island, Missouri, on February 23, 1923, was shot at Miniota, Manitoba, on October 29, 1924.

MALLARD, No. 205,434, banded by L. V. Walton, at Cuivre Island, Missouri, on February 24, 1923, was shot at Kandahar, Saskatchewan, on October 3, 1924.

MALLARD, No. 205,466, banded by L. V. Walton, at Cuivre Island, Missouri, on February 25, 1923, was shot at Miniota, Manitoba, on September 15, 1924.

MALLARD, No. 203,522, banded by John Broeker, at Portage des Sioux, Missouri, on March 1, 1923, was shot at a place about eight miles east of Manitou Lake, Saskatchewan, on October 20, 1924.

MALLARD, No. 205,676, banded by L. V. Walton, at Cuivre Island, Missouri, on March 9, 1923, was killed in the vicinity of Island Lake, about four hundred miles north of Winnipeg, Manitoba, on July 25, 1924.

MALLARD, No. 205,681, banded by L. V. Walton, at Cuivre Island, Missouri, on March 9, 1923, was shot at Fisher's Lake, four miles west of Lashburn, Saskatchewan, on September 16, 1924.

MALLARD, No. 205,702, banded by L. V. Walton, at Cuivre Island, Missouri, on March 10, 1923, was shot on the Muscovegan Indian Reservation, Lestock, Saskatchewan, about eighty miles

*Published by authority of the Canadian National Parks Branch, Department of the Interior, Canada.

north-east of Regina, on October 3, 1924.

MALLARD, No. 203,756, banded by John Broeker, at Portage des Sioux, Missouri, on April 2, 1923, was shot at a place two hundred miles east of the Poplar River Indian Reserve and some six hundred miles north of Selkirk, Manitoba, during the month of September, 1924.

MALLARD, No. 203,771, banded by John Broeker, at Portage des Sioux, Missouri, on April 4, 1923, was shot in Tp. 49, Rge. 8, W. 3rd M., Saskatchewan, on October 4, 1924.

MALLARD, No. 232,505, banded by John Broeker, at Portage des Sioux, Missouri, on April 10, 1923, was shot at Silver Grove, Saskatchewan, about October 10, 1924.

MALLARD, No. 232,021, young, banded by R. Lloyd, at Davidson, Saskatchewan, on July 17, 1923, was killed at the Quiver Club, Mississippi River, one and one-half miles below Hastings Landing, Illinois, on November 29, 1924.

MALLARD, No. 232,043, banded by R. Lloyd, at Davidson, Saskatchewan, on August 12, 1923, was shot near Yorkton, Saskatchewan, on September 27, 1924.

MALLARD, No. 232,053, banded by R. Lloyd, at Davidson, Saskatchewan, on August 12, 1923, was re-captured at the same station on June 1, 1924, and was shot at Pella, Iowa, on November 7, 1924.

BLACK DUCK, No. 204,908, banded by A. A. Allen, at Ithaca, New York, on March 29, 1923, was caught in a rat trap and found dead on Lot 10, Tp. 3, Chandos, Peterboro County, Ontario, on April 12, 1925.

BLACK DUCK, No. 202,542, banded by H. S. Osler, at Lake Scugog, Ontario, on August 24, 1923, was shot at Mad Horse Creek, Salem, New Jersey, on December 27, 1924.

BLACK DUCK, No. 202,547, banded by H. S. Osler, at Lake Scugog, Ontario, on August 24, 1923, was shot in Henderson Harbor, New York, about September 30, 1924.

BLACK DUCK, No. 202,646, banded by H. S. Osler, at Lake Scugog, Ontario, on August 29, 1923, was killed on Cat Island, Mississippi Sound, Mississippi, on November 15, 1924.

BLACK DUCK, No. 202,653, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1923, was killed at a place two miles east of Killarney, Georgian Bay, Ontario, during the fall of 1924.

BLACK DUCK, No. 296,025, banded by H. S. Osler, at Lake Scugog, Ontario, on September 2, 1923, was shot at a place in Norfolk County, Ontario, six miles from Lake Erie, on November 20, 1924.

BLACK DUCK, No. 296,034, banded by H. S. Osler, at Lake Scugog, Ontario, on September 3, 1923, was shot at a place a few miles north of Savanne, Ontario, about April 15, 1924.

BLACK DUCK, No. 296,072, banded by H. S. Osler, at Lake Scugog, Ontario, on September 4, 1923, was killed at Cape Henrietta Maria, James Bay, Ontario, on September 25, 1924.

BLACK DUCK, No. 296,092, banded by H. S. Osler, at Lake Scugog, Ontario, on September 8, 1923, was killed at Jackson Marsh, Waveland, Mississippi, on November 22, 1924.

BLACK DUCK, No. 296,150, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was killed at Sand Beach Marsh, Carroll

Township, Ottawa County, Ohio, on October 21, 1924.

BLACK DUCK, No. 296,151, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was shot on Grace Island, Mouth of the Santee River, South Carolina, on January 16, 1925.

BLACK DUCK, No. 296,183, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was shot at New Carlisle, Indiana, on November 10, 1924.

BLACK DUCK, No. 296,187, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was shot at McLaren's Creek, about five miles north of Lindsay, Ontario, on October 23, 1924.

BLACK DUCK, No. 296,218, banded by H. S. Osler, at Lake Scugog, Ontario, on September 19, 1923, was killed in the Blackwater River, at Milton, Florida, on January 24, 1925.

BLACK DUCK, No. 296,247, banded by H. S. Osler, at Lake Scugog, Ontario, on September 21, 1923, was shot at Lynn Haven, Florida, on December 17, 1924.

BLACK DUCK, No. 296,309, banded by H. S. Osler, at Lake Scugog, Ontario, on September 24, 1923, was shot at a place eight miles east of Conneaut Lake, Conneaut Marsh, Crawford County, Pennsylvania, on December 2, 1924.

BLACK DUCK, No. 296,313, banded by H. S. Osler, at Lake Scugog, Ontario, on September 24, 1923, was killed at Williamstown, West Virginia, on December 21, 1923.

BLACK DUCK, No. 296,358, banded by H. S. Osler, at Lake Scugog, Ontario, on September 27, 1923, was killed at a place in Westmoreland County, on the Potomac River, near Popes Creek, Virginia, on December 20, 1924.

BLACK DUCK, No. 296,371, banded by H. S. Osler, at Lake Scugog, Ontario, on September 27, 1923, was killed at Smith's Point, opposite Bellport, Long Island, New York, on January 15, 1925.

BLACK DUCK, No. 296,401, banded by H. S. Osler, at Lake Scugog, Ontario, on September 28, 1923, was killed on Deals Island, Maryland, on January 9, 1925.

BLACK DUCK, No. 296,425, banded by H. S. Osler, at Lake Scugog, Ontario, on September 29, 1923, was killed at Davis, North Carolina, on November 12, 1924.

BLACK DUCK, No. 296,434, banded by H. S. Osler, at Lake Scugog, Ontario, on September 30, 1923, was killed at the Byrd Spring Rod and Gun Club, Huntsville, Alabama, on December 11, 1924.

BLACK DUCK, No. 296,454, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was shot on the Cocolanious Creek, Perry County, two miles east of Millerstown, Pennsylvania, on November 27, 1924.

BLACK DUCK, No. 296,477, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was killed on Evans Creek, Rome, Georgia, on January 1, 1925.

BLACK DUCK, No. 296,491, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was caught in a muskrat trap at Bishop's Head, Maryland, on January 23, 1925.

BLACK DUCK, No. 296,499, banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1923, was killed at Irving, New Jersey, on November 17, 1924.

BLACK DUCK, No. 297,163, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2,

1923, was shot on Rice Lake, Northumberland County, Ontario, on October 20, 1924.

BLACK DUCK, No. 297,189, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was killed on Hope Creek, Delaware River, Salem County, New Jersey, on November 3, 1924.

BLACK DUCK, No. 297,201, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was found dead at Jackson Creek, Chester River, Maryland, on February 17, 1925.

BLACK DUCK, No. 297,203, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot at a place four miles south of Bloomfield, on the White River, Greene County, Indiana, on December 8, 1924.

BLACK DUCK, No. 297,206, banded by H. S. Osler, at Lake Scugog, Ontario, on October 2, 1923, was shot on Lake Butte Des Mortes Marsh, Winnebago County, Wisconsin, on September 26, 1924.

BLACK DUCK, No. 297,261, banded by H. S. Osler, at Lake Scugog, Ontario, on October 3, 1923, was shot at Point Pelee, Ontario, on November 8, 1924.

BLACK DUCK, No. 297,280, banded by H. S. Osler, at Lake Scugog, Ontario, on October 3, 1923, was killed at Onancock, Virginia, on November 27, 1924.

BLACK DUCK, No. 297,286, banded by H. S. Osler, at Lake Scugog, Ontario, on October 3, 1923, was shot at Havener Pond, Waldboro, Lincoln County, Maine, about October 28, 1924.

BLACK DUCK, No. 297,372, banded by H. S. Osler, at Lake Scugog, Ontario, on October 6, 1923, was killed at Odessa, Delaware, on December 9, 1924.

GREEN-WINGED TEAL, No. 296,352, banded by H. S. Osler, at Lake Scugog, Ontario, on September 25, 1923, was killed at Oconomowoc, Wisconsin, on September 27, 1924.

BLUE-WINGED TEAL, No. 296,384, banded by H. S. Osler, at Lake Scugog, Ontario, on September 27, 1923, was shot at Patton Point, Lake Scugog, Ontario, during the month of October, 1924.

BLUE-WINGED TEAL, No. 296,387, banded by H. S. Osler, at Lake Scugog, Ontario, on September 28, 1923, was killed at a place near Olin, Iowa, on September 29, 1924.

GREATER SCAUP DUCK, No. 228,781, female, banded by D. H. Beyea and A. A. Allen at Union Springs, New York, on February 23, 1923 was found unable to fly at Little Lake, three miles north of Barrie, Ontario, on May 3, 1925.

GREATER SCAUP DUCK, No. 204,343, banded by Douglas H. Beyea, at Union Springs, New York, on March 13, 1923, was shot on the St. Lawrence River, four miles from Kingston, Ontario, on November 21, 1924.

COOT, No. 210,970, female, banded by Herman Battersby, at Oak Lake, Manitoba, on May 31, 1923, was shot at Clear Lake, Iowa, on October 27, 1924.

CROW, No. 210,671, male, banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on April 22, 1923, was shot at a place one-half mile south of where it was banded, on June 5, 1925.

BRONZED GRACKLE, No. 218,749, banded by R. E. Horsey, at Rochester, New York, on August 5, 1923, was shot at a place in Lincoln County, Ontario, one and one-quarter miles south of Lake Ontario, and eighteen miles west of Niagara Falls, on May 16, 1925.

CHICKADEE, No. 56,226, banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on April 21, 1923, was caught and killed in a mouse trap in the same locality, on February 1, 1925.

(To be continued)

PROSECUTIONS

MIGRATORY BIRDS CONVENTION ACT, BY OFFICERS OF THE CANADIAN NATIONAL PARKS AND ROYAL CANADIAN MOUNTED POLICE

Reported during the period: November 13, 1924, to September 15, 1925.

WOLFE, Gerald, Grand Desert, Halifax Co., N.S. Having in possession Semipalmated Plover. Fine: \$10.00.

MYATTE, Adam, Grand Desert, Halifax Co., N.S. Having in possession Semipalmated Plover. Fine: \$10.00.

EGAN, James T., Lower Water St., Halifax, N.S. Attempting to kill Black-breasted Plover and Greater Yellow-legs by the use of an automatic shot gun. Fine: \$50.00. Forfeitures: One automatic shotgun.

HUNT, J. W., 79½ Lawrence St., Halifax, N.S. Having in possession Semipalmated Plover. Fine: \$10.00.

SIMMONS, Daniel, Yarmouth, N.S. Killed three Black Ducks in close season. Fine: \$15.00.

LEMAN, Lloyd, West Devon, P.E.I. Killed one Great Blue Heron. Forfeitures: One shotgun. Sentence suspended.

BROWN, George, Seal Cove, N.B. Killing White-winged Scoters by the use of a motor-boat. Fine: \$10.00.

NELSON, Andrew, Seal Cove, N.B. Killing White-winged Scoters by the use of a motor-boat. Fine: \$10.00.

FRASER, Kenneth, Seal Cove, N.B. Killing White-winged Scoters by the use of a motor-boat. Fine: \$10.00.

JUVENILE, Seal Cove, Grand Manan, N.B. Injuring Herring Gulls. Sentence suspended.

MORSE, Warren, Grand Manan, N.B. Attempting to kill wild ducks by the use of a motor-boat. Fine: \$10.00.

RUSSELL, Arnold, White Head, Grand Manan, N.B. Molesting wild ducks in close season. Fine: \$10.00.

RUSSELL, Arnold, White Head, Grand Manan, N.B. Attempting to kill wild ducks by the use of a motor-boat. Fine: \$10.00.

WOOSTER, Brantford, Grand Harbor, Grand Manan, N.B. Attempting to kill Black Ducks later than one hour after sunset. Case dismissed.

MORSE, Warren, Grand Manan, N.B. Molesting wild ducks in close season. Fine: \$10.00.

WOOSTER, Brantford, Grand Harbor, Grand Manan, N.B. Hunting Black Ducks in close season. Case dismissed.

DROUILLARD, Henry, Walkerville, Ont. Attempting to kill migratory game birds after sunset. Fine: \$10.00.

MARTIN, Alphonse E., 10,009 Jasper Ave., Edmonton, Alta. Selling migratory game birds—one Mallard. Fine: \$15.00.

PHAEI, John, North Sydney, N.S. Attempting to kill wild ducks by the use of a motor-boat. Sentence suspended.

CAMPBELL, Dan, North Sydney, N.S. Attempting to kill wild ducks by the use of a motor-boat. Sentence suspended.

EVANS, William, North Sydney, N.S. Attempting to kill wild ducks by the use of a motor-boat. Sentence suspended.

MCDONALD, E. L., Halifax, N.S. Offering Black Ducks for sale. Fine: \$10.00.

ASOFUF, Abraham, Baie St. Anne, N.B. Selling Canada Geese. Fine: \$10.00.

GILLIS, W. R., Kouchibouguac Beach, N.B. Trafficking in Canada Geese and Brant. Fine: \$300.00. Forfeitures: Seven Canada Geese and four Brant.

ALLEN, John J., Port Elgin, N.B. Shooting Scoters from a motor-boat. Fine: \$10.00.

COMEAU Peter, Tracadie, N.B. Offering Canada Geese for sale. Fine: \$10.00.

LOUSIER, Fred, Tracadie, N.B. Offering Canada Geese for sale. Fine: \$10.00.

ALLEN, John J., Port Elgin, N.B. Killed a Herring Gull. Sentence Suspended.

MORSE, L. Roy, White Head, N.B. Hunting Scoters in the close season. Sentence suspended.

MORSE, L. Roy, White Head, N.B. Having dead Scoters in possession in close season without lawful excuse. Fine: \$10.00.

PALMER, Charles, Tabusintac, N.B. Selling Canada Geese. Fine: \$10.00.

COSSABOON, Geo., Grand Harbor, N.B. Hunting wild ducks in close season. Fine: \$10.00.

COSSABOON, Geo., Grand Harbor, N.B. Resisting an officer in the discharge of his duty. Fine: \$20.00.

JUVENILE, Lower Nicola, B.C. Shooting a Swan. Sentence suspended.

McKENZIE, Russell A., Woodside, N.S. Killing Brant in close season. Fine: \$10.00.

BREDEAU, Fred, Tracadie, N.B. Having in possession a Sandpiper. Fine: \$10.00.

LANGLOIS, Arthur J., (Son of Adolph Langlois), Anderton Tp., Ont. Hunting migratory game birds in close season. Fine: \$10.00. Forfeitures: Seven decoys.

LANGLOIS, Arthur J., (Son of Albert Langlois), Anderton Tp., Ont. Hunting migratory game birds in close season. Fine: \$10.00.

HILL, Charles, Amherstburg, Ont. Shooting ducks during close season. Fine: \$10.00.

RYAN, Clarence, Sunnyside, Ont. Shooting ducks during close season. Fine: \$10.00.

TAYLOR, Thomas, Tilbury, Ont. Shooting Canada Geese in close season. Fine: \$25.00.

DOREY, Joseph, West Arichat, N.S. Shooting wild ducks in close season. Fine: \$10.00.

WALFIELD, Reginald, Bell's Island, Lunenburg Co., N.S. Hunting wild ducks in close season. Fine: \$10.00.

WALFIELD, Leo, Bell's Island, Lunenburg Co., N.S. Hunting wild ducks in close season. Fine: \$10.00.

HISELER, Lloyd, Steven's Island, N.S. Killing Old-squaws in close season. Fine: \$20.00. Forfeitures: Four Old-squaws.

DUGUAN, Wilfrid, Shippigan Gully, N.B. Hunting Scoters in close season. Fine: \$10.00. Forfeitures: Four Scoters.

DUGUAN, Joseph, Shippigan Gully, N.B. Hunting Scoters in close season. Fine: \$10.00. Forfeitures: One Scoter.

HACHE, James, Shippigan Gully, N.B. Hunting Scoters in close season. Fine: \$10.00. Forfeitures: Scoters.

HACHE, Edward, Inkerman, N.B. Hunting Scoters in close season. Fine: \$10.00.

ROSS, Laura (Mrs.), Tabusintac, N.B. Buying Brant. Fine: \$10.00.

ROSENZWERG, Geo., Horizon, Sask. Having in possession dead duck without lawful excuse in close season. Fine: \$10.00.

NOTES AND OBSERVATIONS

THE INTRODUCTION OF THE EUROPEAN GREY PARTRIDGE IN MANITOBA.—The Ottawa Field-Naturalists' Club is indebted to Mr. J. H. Evans, Deputy Minister, Department of Agriculture and Immigration, Province of Manitoba, for official advice that the European Grey Partridge has been introduced in Manitoba. In March, 1924, the Manitoba Game Protective League, Dr. H. J. Merkeley, Secretary, imported 108 of these birds. They were kept at the Manitoba Agricultural College for about a week after arrival so that they could be properly fed and partly acclimatized before being released, and were finally liberated on the farm of Jerry Robinson, at Warren, Manitoba, which is about thirty miles northwest of Winnipeg. The district is said to be reasonably well suited to their needs. The Winnipeg *Free Press* says that forty-five brace were released, the event taking place on Sunday, April 6, 1924. Motion pictures

were taken of the birds and the members of the League and officials who were present. Premier Bracken's little son held one of the birds to be released. Arrangements were made to feed the birds until they became accustomed to their new environment. The Winnipeg *Tribune* and Mr. E. G. White, who was present at the liberation of the newest of Manitoba's game birds, credit the Assiniboia Gun Club as well as the League mentioned with sponsoring the acclimatization effort. In the Winnipeg *Free Press* of March 29th it is said that the birds were secured in Czecho-Slovakia, and that they had cost about twelve dollars a pair. Further introductions are planned and complete protection is being given the species until it has a chance to become established.—HOYES LLOYD.

AN IVORY GULL, *Pagophila alba*, Gunn., OBSERVED AT VICTORIA, B.C.—On 19 February,

1925, a gull believed to be of this species was observed in Victoria Harbour. It was standing on the cabin roof of a small yacht, which was moored close to the Causeway. It was observed for several minutes at close range: in colour it was pure white all over without any shading or marking of grey or black; the eye was dark. The bird was close enough to have been recognized as an albino had it been such. In size it appeared to be slightly larger than the Short-billed Gull, with which it was sharing the cabin roof. It appeared to be standing in a somewhat crouched position, but, after examining the specimens in the Provincial Museum, I have come to the conclusion that this appearance was due to the tarsus being relatively shorter than is the case in species of the genus *Larus*.

I do not know of any records of this species from Victoria, though it has been taken at and recorded from other points in British Columbia.—W. H. A. PREECE.

CHRISTMAS BIRD CENSUSES IN CANADA.—For some years now *The Canadian Field-Naturalist* has published a number of bird censuses taken at Christmas time by bird students in various parts of Canada. A limited number of Canadian ornithologists take an annual census at Christmas time which is published in *Bird-Lore*. At present these censuses are not well distributed in Canada, and it is thought that many other bird students would be willing to devote a day to taking a Christmas bird census, if they knew of the importance of this effort. The bird census is the best guide to tell us where our bird population is in winter, and its importance is increased because through the work of *Bird-Lore* censuses of this kind are taken throughout the United States.

The rules for taking a bird census, as given in *Bird-Lore* are, briefly, as follows:—

The census should be taken on Christmas day or as near that date as circumstances permit: time limits, December 22nd to December 27th except that in the Rocky Mountains and westward the time limits are December 20th to 25th. Each census-taker should send in only one census. A census walk should last four hours at the very least, and an all-day one is preferable. Each report must cover one day only. When two or more names are signed to a report, a statement should be made as to whether the workers counted together, or separately. Census area should have a diameter of not more than fifteen miles. Unusual records should be accompanied by a brief statement as to identification. Fuller details are

given in *Bird-Lore*, November-December numbers.

The Canadian Field-Naturalist has published in the past those Canadian censuses that have been sent to it, and the hope is expressed that every competent person in Canada will try to arrange to send a bird census this year to our paper and to *Bird-Lore*, where the results for the United States and Canada are published.—HOYES LLOYD.

A CASE OF DISEASE IN THE CALIFORNIA PART-
RIDGE (QUAIL), *Lophortyx californicus californicus*,
Shaw.—On 31st January, 1925, when walking near
Mount Tolmie, Victoria, B.C., I saw a California
Partridge (♂) picking up grit on the road ahead
of me. It appeared to be in a somewhat weak
condition and allowed me to walk up to it and
capture it without making any great effort to
escape. I picked it up at 3.30 P.M. and took it
home with me; it expired at 6.30 P.M.

The bird was in very poor condition, nothing
but skin and bone; this cannot have been through
lack of food, as its bowels moved three times dur-
ing the period that I had it under observation.
The plumage was in excellent condition.

The carcass was taken down to the Provincial
Museum, where it was skinned and examined by
Mr. G. A. Hardy. The liver was found to be
very much affected, one lobe being in a condition
so abnormal as to render it incapable of function-
ing, the other being in the initial stage of infection.
—W. H. A. PREECE.

GANNETS OF BONAVENTURE ISLAND, QUEBEC.—
In 1923 there were forty-seven nests of Gannets on
a ledge in the sanctuary that I had not seen occu-
pied by Gannets before. In 1924, there were
seventy-two. This year (1925) the birds have
extended the ledge by digging away the clay down
to the rock, and there are about four hundred
occupying that ledge now, although not all are
nesting yet.

As I understand, young Gannets mate in their
second year. A Gannet will locate a place to
nest, make a part of a nest, and, in the following
spring, will return, complete the nest and lay its
eggs.—WILLIAM M. DUVAL.

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No. 8

JANUARY BIRD NOTES FROM MOUNT TOLMIE, VICTORIA, B.C.

By W. H. A. PREECE



THIS is not intended that the following note-should be regarded as constituting anything approaching a seasonal census or check-list of the birds of the district indicated in the title of this paper. My opportunities for observing have been too limited to permit of anything so ambitious. It may be, however, that the following gleanings from my note-book will be of interest to those living in less ornithologically favoured parts of Canada, as indicative of the numerous species of birds that may be met with here whilst taking a winter walk.

All the species hereafter dealt with, have been observed during January of this year.

The area here dealt with consists of Mount Tolmie and the country lying to the south and west of it. One expedition was made to the north of the mountain, but the district to the east was not visited at all.

THE SOUTHERN SLOPES

The Southern slopes are, in the main, covered with scrub oaks. The districts north, west, and south of it consist of open fields, market gardens and orchards; oak trees are plentiful throughout and there are also a number of oak coppices and woods. The oak is the typical tree of the district, though alder, willow and Douglas fir are also to be found. The fact of some eighty per cent of the trees being oaks possibly limits the number of species of birds to be observed in the district. Had I visited the country to the east of the mountain, where there is a considerable tract of conifers, mainly Douglas firs, I believe, it is probable that some species not recorded would have been observed and others recorded occasionally would have been found there in abundance.

GLAUCOUS-WINGED GULL, *Larus glaucescens*, Naum. AMERICAN HERRING GULL, *Larus argentatus smithsonianus* Coues. SHORT-TAILED GULL, *Larus brachyrhynchus*, Rich.

The three species mentioned above were to be seen in quantity on the fields and vacant lots and in the air almost daily. It is quite possible that still other species were observed, but no others were satisfactorily determined.

Mr. J. A. Munro, in *The Canadian Field-Naturalist*, Vol. XXXVIII, p. 148, gives some

interesting information about the habits, etc., of *Larus glaucescens* in this district.

WILSON'S SNIPE, *Gallinago delicata*, Ord.—The only record was obtained on January 1. The bird seen was remarkably tame, allowing me to come within a few feet of it before taking flight; I flushed it three times from a roadside ditch. On the first two occasions, it flew about fifteen yards and then resumed feeding, but on the last occasion it circled round me and returned to the ditch about twenty yards in my rear.

GREY PARTRIDGE, *Perdix perdix*, Linn.—An introduced species. A covey of eight birds has been observed on the flats south-west of Mount Tolmie almost daily throughout the winter.

CALIFORNIA PARTRIDGE, *Lophortyx californicus*, Shaw.—An introduced species. Abundant around Mount Tolmie. Their "Who goes there" is quite the most frequently heard call.

RING-NECKED PHEASANT, *Phasianus torquatus*, Linn.—An introduced species. Abundant.

HARRIS'S WOODPECKER, *Dryobates villosus harrii*, Aud. GAIRDNER'S WOODPECKER, *Dryobates pubescens gairdneri*, Aud.—The above two species were only recorded once each during January. Both are common residents on Vancouver Island trees, which would account for their scarcity in this district.

LEWIS'S WOODPECKER, *Asyndesmus torquatus*, Wils.—In *The Canadian Field-Naturalist*, Vol. XXXVIII, p. 176, Mr. J. A. Munro refers to this species as follows: "A common summer resident of local distribution" (in Southern Vancouver Island); after which he gives two winter records. In the remarks on the species in the *Catalogue of British Columbia Birds* compiled by Mr. Francis Kermode and printed in 1904, we find the following: "A summer resident on Vancouver Island".

My own observations did not coincide with the above statements. I mentioned the fact to Mr. Kermode, who supplied me with the following information. Some twenty-five or more years ago this species only occurred here as a rare straggler and gradually became established as a summer resident, but for some years a number appear to have been thoroughly acclimatized and are now residents, staying here all the year round,

There is, however, no doubt that in summer the number of the species is considerably augmented by immigration.

I believe that the local distribution referred to by Mr. Munro will be found to coincide with the local distribution of the oak trees to which this species seems particularly attached. It has a great fondness for telegraph poles; on rather more than half of the numerous occasions in January that I observed the species, it was associated with them, the bird either running up the pole or more often perched on the top.

At least two birds were resident in the Mount Tolmie district.

NORTH-WESTERN FLICKER, *Colaptes cafer saturator*, Ridgw.—Abundant, frequently seen and even more frequently heard.

SKYLARK, *Alauda arvensis*, Linn.—Originally introduced by the Natural History Society of British Columbia, this species has increased and multiplied so that it may now be regarded as locally abundant. I heard them singing on January 27 for the first time this year and since then have heard them almost daily.

STELLER'S JAY, *Cyanocitta stelleri*, Gmel.—One of our handsomest birds. This species was abundant all over the city throughout the fall and early winter, but after Christmas was very little in evidence. I saw one on January 1, but, after that neither saw nor heard anything of the species until January 30, when I watched a flock of six invade a poultry run only to be forced to beat a hasty retreat before the determined assault of some Plymouth Rocks, the rightful owners of the run.

Mr. Munro, in *The Canadian Field-Naturalist*, Vol. XXXVIII, p. 176, gives some interesting data regarding this species here.

NORTH-WEST CROW, *Corvus caurinus*, Baird.—Abundant and always very much in evidence.

NORTHWESTERN REDWING, *Agelaius phoeniceus caurinus*, Ridgw.—Numbers of this species were observed on two occasions in company with the flock of Brewer's Blackbirds, alluded to later.

I observed nesting colonies at Lost and Prospect Lakes last summer and there are doubtless similar colonies in most other suitable localities throughout the district.

WESTERN MEADOWLARK, *Sturnella magna neglecta*, Aud.—Was seen and heard singing almost daily. First heard singing January 1. The birds here appear very erratic in their habits, in certain areas always appearing in flocks of twenty or more, in other areas always being found singly or in pairs.

BREWER'S BLACKBIRD, *Euphagus cyanocephalus*, Wagl.—A large flock numbering many hundred has been around the district throughout the winter. This species presents a case almost parallel to that of Lewis's Woodpecker, so Mr. Kermodé informs

me; that is to say, the species formerly scarce locally, has of late years become common, even abundant. In the *Catalogue of British Columbia Birds* printed in 1904, amongst the remarks on this species, we find the following: "Not common on Vancouver Island; a few have been taken near Victoria".

EUROPEAN HOUSE SPARROW, *Passer domesticus*, Linn.—This undesirable alien, though present, is fortunately not yet by any means so omnipresent as in the Eastern Provinces.

NUTTALL'S SPARROW, *Zonotrichia leucophrys nuttalli*, Ridgw.—One observed January 15 in company with a flock of Oregon Juncos.

WESTERN CHIPPING SPARROW, *Spizella socialis arizonae*, Cones.—Not by any means common, but was observed on several occasions.

OREGON JUNCO, *Junco hyemalis oregonus*, Towns.—One of the most abundant winter birds here. Numerous flocks were observed almost daily.

RUSTY SONG SPARROW, *Melospiza melodia morphna*, Oberh.—Frequently observed; first heard singing January 23.

OREGON TOWHEE, *Pipilo maculatus oregonus*, Bell.—Can hardly be called common, but can usually be observed in one or two localities. Not quite so attractive, perhaps, as the Eastern race, but nevertheless a pleasure to meet. The call note seems to me to be rather more guttural and rasping than that of the eastern bird. I would render it as *Erd-zee-ee-ee*.

WESTERN HOUSE WREN, *Troglodytes aedon parkmanni*, Aud.—Several records, all towards the end of the month. One heard singing January 30.

RED-BREASTED NUTHATCH, *Sitta canadensis*, Linn.—One record only; January 25.

CHESTNUT-BACKED CHICKADEE, *Parus rufescens*, Towns.—Very numerous, seldom out of sight and hardly ever out of hearing.

WESTERN GOLDEN-CROWNED KINGLET, *Regulus satrapa olivaceus*, Baird. **SITKA KINGLET**, *Regulus calendula grinnelli*, W. Palmer.—Both species frequently to be seen, usually in company with Chickadees.

WESTERN ROBIN, *Planesticus migratorius propinquus*, Ridgw.—By no means numerous, though one or two are usually to be seen in the course of a walk.

VARIED THRUSH, *Ixoreus naevius*, Gmel.—This beautiful bird was to be seen quite commonly during the fall and early winter, but I only obtained three records for it in January. I consider this quite the handsomest of our winter birds. I do not know who inflicted the "popular" name upon the species, but I'm convinced he can only have known the bird as a skin. It would have been no greater insult to call it a Skewbald Robin or a Parti-coloured Ixoreus.

THE NEW BIRD SANCTUARIES IN THE GULF OF ST. LAWRENCE

By HARRISON F. LEWIS



MYRIADS of sea-birds, including valuable Eider Ducks, quaint Puffins, and splendid Caspian Terns, have long found a home on the many islands which fringe the north shore of the Gulf of St. Lawrence. During the nineteenth century, they were subject to severe persecution and their numbers rapidly dwindled. In recent years, however, the protection which they have received under the terms of the Migratory Birds Convention Act has enabled the survivors to nest in greater safety and to make good a part of their previous losses. It is expected that they will make even more rapid gains in future, for during the year 1925 the Department of the Interior of the Dominion Government has established ten bird sanctuaries for their benefit. These sanctuaries can be visited with comparative ease, for the north shore of the Gulf of St. Lawrence is served in summer by well-appointed and comfortable steamers, with weekly sailings from Quebec City, while the eastern end of this coast

has, in addition, weekly communication by steamer with ports on the west coast of Newfoundland. There are no hotels near the sanctuaries, but in most instances good board in private houses can be obtained. Thus some of the most attractive and least known of our sea-birds can be studied in their homes. Permits to collect birds or eggs for scientific purposes are not, however, valid in the sanctuaries themselves.

The following table shows in detail the numbers of the sea-bird population of these sanctuaries in 1925. This, of course, is only a fraction of the bird population of this entire coast. The figures given are as accurate as it has been possible to make them; they are in part the result of careful counts and in part of conservative estimates, made by the writer. Shorebirds, such as Spotted and Least Sandpipers and Semipalmated Plovers, which nest in some of the sanctuary areas, are not included in this table.

SEA-BIRDS BREEDING IN NEW BIRD SANCTUARIES IN GULF OF ST. LAWRENCE, 1925

BIRDS	SANCTUARIES										TOTAL
	Birch Islands	Betchouane	Watshishow	Fog Island	Wolf Bay	Cape Whittle	St. Mary Islands	Mecatina	St. Augustine	Bradore Bay	
Eider.....	620	300	3,850	400	100	80	500	400	200	....	6,540
Black Duck.....	...	...	...	2	2	2	...	...	...	...	6
Green-winged Teal.....	...	...	...	2	...	...	...	...	...	...	2
Red-throated Loon.....	...	...	...	4	...	...	10	2	8	...	24
Puffin.....	...	300	...	...	3,000	...	1,250	...	...	51,000	55,550
Black Guillemot.....	...	...	...	60	...	...	130	100	30	...	320
Common Murre.....	...	...	...	64	314	3,062	3,600	...	...	200	7,240
Razor-billed Auk.....	...	300	60	20	2,150	400	3,500	50	...	4,100	10,580
Great Black-backed Gull.....	12	24	220	80	122	70	150	250	40	...	968
Herring Gull.....	60	200	200	80	100	30	200	100	50	...	1,020
Ring-billed Gull.....	...	...	...	210	...	...	...	60	...	...	270
Caspian Tern.....	...	...	...	60	...	...	...	...	...	...	60
Common Tern.....	...	200	500	56	...	...	...	...	...	...	756
Arctic Tern.....	...	40	50	6	...	...	...	...	...	...	96
Double-crested Cormorant.....	...	...	...	750	280	334	...	...	...	...	1,364
TOTAL.....	692	1,364	4,880	1,794	6,068	3,978	9,340	962	328	55,300	84,706

Birch Islands Sanctuary is the westernmost of these ten sanctuaries and is about 425 miles from Quebec by the steamship route. It consists of two wooded islands, each about a mile across, and one small island, bare of trees. The largest island contains some attractive ponds. The chief breeding sea-bird is the Eider Duck, which here usually hides its nest under trees or shrubbery. Mingan, where the steamers call and where accommodation can be obtained, is about four miles distant.

Betchouane Sanctuary, about 460 miles from Quebec, contains three islands, the largest of which is densely wooded, while the two others are treeless. As the table shows, this sanctuary contains quite a variety of sea-fowl, including some hundreds of Puffins and Razor-billed Auks. These two

highly interesting species do not nest in any numbers on this coast west of this point. Accommodation for one or two persons could probably be obtained at Betchouane, two miles from the sanctuary, but the nearest port of call for the steamer is Havre St. Pierre, about seventeen miles away.

Watshishow Sanctuary is a large area, extending some eleven miles along the coast, and including a great number of small islands, which are all practically treeless, but which show great variety of form and arrangement. This sanctuary is pre-eminently the home of the famous Eider Duck, whose abundance here is truly astonishing and whose nests are more readily seen on these bare islands than on the thickly wooded islands farther

westward. It is a thrilling sight to see hundreds of great black-and-white drakes and their brown mates whirling about like leaves before the blast as one sails into one of the multitude of uninhabited harbors formed by the islands in this area. It is even more delightful to remain quietly in some inconspicuous place and watch the handsome birds sailing about on the blue water, feeding and courting, or resting in groups on the reddish-brown rocks. Visitors to Watshishow Sanctuary must provide their own accommodation. The nearest place at which the steamer calls is Baie Johan Beetz, about ten miles from the sanctuary and 480 miles from Quebec.

Fog Island Sanctuary, consisting of Fog Island and all the islands and rocks within two miles of Fog Island, is about 590 miles from Quebec, 65 from the steamers' point of call at Natashquan, and 11 from the little village of Romaine. It is a very attractive area, with moss-covered, rocky islands studding the smiling waters in most intricate fashion. It contains the greatest variety of sea-birds to be found in any of the sanctuaries along the north shore of the Gulf of St. Lawrence, no fewer than fourteen different species making their homes here in 1925. Remarkable among them are the dashing Caspian Terns, with their scarlet beaks and raucous voices, which are not known to nest anywhere else in the Province of Quebec at the present time, and the graceful, retiring Red-throated Loons, which nest beside small ponds in the moss. This sanctuary is the westernmost place known on this coast where the confiding Common Murres are accustomed to breed. Each pair of these birds hatches each year only a single egg, which is often laid on the bare rock. Thirty-two of their eggs and young were counted in this sanctuary in 1925. There is no accommodation to be had near Fog Island Sanctuary, and visitors must camp outside the sanctuary or live afloat.

Wolf Bay Sanctuary is a long chain of islands lying along the western side of the bay after which it is named. It contains an abundance of Puffins and Razor-billed Auks and a moderate number of other species. Accommodation is available here, but the nearest port of call of the steamer is at Harrington Harbour, 45 miles away. Wolf Bay is about 605 miles from Quebec.

Cape Whittle Sanctuary consists of a number of islets lying well out to sea near Cape Whittle. While it contains Eiders, Gulls, Auks, Double-crested Cormorants and Black Ducks, the most numerous bird in the sanctuary is the Common Murre. The Murre lays its handsome eggs in the open on several of the islets in the sanctuary, especially on Egg Rock, where 1263 eggs and young, representing 2526 adult birds, were counted

on July 21, 1925. Close to Cape Whittle Sanctuary is situated a small colony, the only one now remaining on the north shore of the Gulf of St. Lawrence, of the so-called "Common" Cormorant. Cape Whittle Sanctuary is about 615 miles from Quebec by the steamship route along the coast. The nearest accommodation is at Wolf Bay settlement, five or six miles away. The nearest port of call for the steamer is at Harrington Harbour, 35 miles distant.

St. Mary Islands Sanctuary contains an unusually large and varied bird population, nesting on four large islands and two small ones. The islands are practically treeless, and are adorned by a large number of small ponds, which are very attractive to the birds. The sea-birds are also attracted to these islands in the nesting-season by the presence there of many large cracks and fissures in the solid rock, in which animated crowds of Murres and Auks rear their young in shelter and comparative security. This is one of the best sanctuaries from the point of view of the occasional visitor, both on account of the abundance and variety of its bird-life and because it contains a secure harbor for small boats, with limited accommodation at the light-keeper's dwelling. This sanctuary is about 12 miles from Harrington Harbour, where the steamers call, and is about 635 miles from Quebec.

Mecattina Sanctuary is situated in the large bay between the communities of Whale Head and Mutton Bay, and contains no less than 138 islands, of various sizes, charmingly situated about deep and sheltered waterways. Here was once a great bird population, most of which has long since been destroyed or driven away, although scattered remnants of at least seven species still remain. It is expected that, under sanctuary conditions, the bird life will soon become more abundant. The steamer stops regularly at Mutton Bay and accommodation may be secured there or at Whale Head. Mecattina Sanctuary is about 660 miles from Quebec.

St. Augustine Sanctuary contains a group of small islands near the mouth of the St. Augustine River. While these islands, as well as others in the neighborhood, are ideally suited to the needs of nesting sea-birds, yet the bird life of all this part of the coast has received such harsh treatment from the hand of man that only a very small fraction of the original bird population now remains. It is hoped that the provision of peace and safety within the bird sanctuary and the enforcement of the Migratory Birds Convention Act all along the coast will cause the bird-life in this region to return to normal, with the sanctuary as its chief stronghold. The steamer stops at St. Augustine, where there is limited accommodation.

This sanctuary is about 710 miles from Quebec.

Bradore Bay Sanctuary contains Perroquet and Greenly Islands, near the western entrance to the Straits of Belle Isle. The most abundant nesting bird here is the laughable Puffin, which usually nests in the shelter of a burrow, which it excavates in the soil. At this point, which was a recognized fishing station early in the sixteenth century, these birds have been subjected to severe persecution from white men for nearly four hundred years. While this brought about a terrible reduction in their numbers, it was surprising to see how many thousands still maintained themselves here when the coming into force of the Migratory Birds Convention Act stopped the slaughter. Since that time the nesting birds of Perroquet Island, in particular, have increased markedly in numbers.

Owing to the unsatisfactory results of the various attempts to estimate the great numbers of the ever-changing multitudes of birds at Perroquet Island, it was determined to make a systematic count of the Puffin burrows on the island, July 8 and 9, 1925, were spent by Game Officer C. K. McLeod and the writer in making this count. By means of little stakes the island was marked off into strips of land of convenient size and in one strip after another the occupied burrows were counted carefully. Each burrow was con-

sidered to represent at least one pair of Puffins. In support of this view it may be stated that each of six burrows which were opened at random for scientific purposes on June 30 contained a Puffin incubating an egg, while old residents, who in years gone by had excavated hundreds of burrows, stated that each occupied burrow contained at least one pair of Puffins, while occasionally a burrow branches into two or three parts underground and a pair made their home in each branch. The total number of burrows counted on Perroquet Island was 22,102, representing 44,204 Puffins. A considerable number of Puffins nest on this island among boulders near the shore, where their homes could not be counted, and these are considered to be quite sufficient to bring the total number of Puffins nesting on Perroquet Island up to 45,000. This island is also the home of about 4,000 Razor-billed Auks and 200 Common Murres. It is an exciting experience for one who visits Perroquet Island for the first time to see the huge clouds of birds which sweep about the island like swarms of giant gnats. Such displays are especially striking towards evening or on stormy days, for in fine weather many of the birds are away in search of food during the greater part of the day. Accommodation may be had at Bradore Bay, which is about 775 miles from Quebec.

BIRD BANDING REPORT—SEPTEMBER 1924 TO MARCH 1925 **"Mavisburn" Banding Station. Mill Bay, Victoria Island, B.C.**

By G. D. SPROT



HE description of my former station (see report 1923-1924) now sold, applies likewise to my present one, as they adjoin.

The land is all 'wild', and up to date has but one or two acres cleared. This clearing is being laid out in garden. A small mountain stream flows by the house, its somewhat steep banks being clothed with Firs and Cedars, Maples and Alders, etc., of about fifteen years growth. The conifers only, on the south side, are being cleared off to let in light and air to the stream. The undergrowth of Salmon and Thimble berries are being encouraged in patches and other berry-bearing trees and shrubs planted.

TRAPS

On account of the labour entailed in connection with the clearing of my station, I have had little time to devote to experimenting with traps, but one little addition to the attractions for birds is a small bird-bath placed beside each permanent trap position. If desired, the trap may be set over it. Its cost is from 5c. to 10c. A shovel full of earth is removed, and a few pebbles stamped into the

hole, forming a saucer-shaped hollow. This is then covered with an inch or so of cement. Its size is from 12 inches to sixteen inches diameter.

CALIFORNIAN PARTRIDGES

I have negative information only to offer on this species, but it helps support my previous suggestion (see report 1923-1924) that the species may be found to be intensely local in their movements. Although those previously taken on my old station are seen there almost daily, and despite my efforts to draw them, they have not as yet trespassed on my new station. Their nearest feed table here would be only some fifty yards away from the spot they now frequent and where they get little encouragement.

STELLER'S JAYS

Are becoming an increasingly interesting study. 260902, banded Sept. 27, 1923, is still present, Although not exactly proved, it appears obvious that this bird is a male, being larger and brighter plumaged than two other birds caught with him at different periods, early and late, throughout the summer and to which he seemed obviously mated.

The worn plumage and poor condition of these two females (?) with the immaculate appearance of the male throughout the season, suggested rather that the male does not assist in incubation, and with the presence of the second female, that he takes a different partner for the second sitting although, of course, but I do not think it, an accident may have happened to the first female in the interval. This male is known when at large by a fringe of white or palest of blue to the tips of the tail feathers. This was first noted in September, 1924, when he was discovered crooning to himself on a limb which held what was apparently the past season's nest. This pale fringe is still present (March 26, 1925), and the bird appears to be cleanly through the moult, which in 1924 and 1925 took place in January. Very noticeable also are the forehead stripes, now appearing longer than formerly, and fading to a very pale blue. The balance of the plumage remains, however, as brilliant as always.

Another old friend, 260908, banded October 12, 1923, is likewise still present, and nested close by in 1924.

The young Jays first came to the traps on May 27, in 1924.

GOLDEN and WHITE-CROWNED SPARROWS

Whilst my house was being built, I rented one near by, and on September 4th, 1924, put out a funnel trap. Although working away from my rented home for the most part of the day, I was able to band before 8 A.M., during the lunch hour, and after 5 P.M., nine jays, ninety-five Golden-crowned Sparrows, eleven Nuttalls', three Juncos, four Song Sparrows, six Towhees, and got two hundred and twenty-seven "repeats" in about two weeks.

Curiously enough, the first spring arrival of the *Zonotrichia*, noted on the roadside March 31, 1925, was a banded Nuttall's Sparrow.

OREGON JUNCO

Several 1923 and 1924 birds have returned again, but this species has been scarce this winter until March 24, when two hundred to three hundred suddenly dropped from the skies onto my freshly seeded grass patch. It was impossible to keep them off, as, like a plague of locusts, they settled within a few feet of us. They appeared ravenous

and feared nothing. This unusual spring shower of Juncos extended, from my own observation, from Victoria to North Cowichan, possibly over the whole south-east portion of the Island, freshly seeded grass fields being alive with them. They did not, however, stay long, and well over a hundred were banded before they left, sixty being taken the first day in one funnel trap, in a few hours, not counting "repeats".

Ticks, as reported previously, were again found on over twenty-five percent of this season's winter resident Juncos.

OREGON TOWHEES

My work with this species received a rude check, when I was forced to give up banding them on account of continually finding tightened bands. Try what I would, nothing could be done to prevent this. Amongst several of the repeats whose bands were all right, were many old friends that had wintered and nested in 1924, and are again repeating the performance this year. They are very local.

WEATHER

Records of weather are kept in connection with banding, and I find it probable that on Vancouver Island in spring, migration starts—as shown by the movements of sea-birds—and residents mate and start nesting, with the first northerly wind after or about the 1st of March. A few days after this, should the wind "back" to west of north, migration receives a check, and earlier than usual, large numbers of "partial migrants" are noted, as Goldfinches, Robins, Bluebirds, etc., being brought to earth by an unfavourable wind. If, however, the wind swings round to east, remaining so for over twenty-four hours, the same thing occurs, but in addition, a southerly, or return movement may be looked for. It may also be found that the abundance or scarcity of many species during migration, is, to a great extent, governed by the direction and force of the wind. During spring migration, storms from the south-east may bring fairly common and even uncommon species in fair abundance, whilst the more common species may appear scarce. Anti-cyclonic weather (which is usual here during both the spring and autumn migrations), on the other hand, may mean that birds will appear in their usual numbers on their usual dates, it being a normal migration.

SQUIRRELS EATING AMANITA MUSCARIA

By W. S. ODELL, Ottawa, Ontario



On the 9th of October of this year, when one expected to find only fall varieties of mushrooms, three fine specimens of the deadly *Amanita muscaria*, or Fly Agaric, in a vigorous condition, were found growing in a

small wooded area at Green's Creek, which crosses the Montreal road about eight miles from the city of Ottawa. On revisiting the place four days later no trace of them could be found. This was surprising, as the woods are a mile from the road

on the banks of the Ottawa River, and unlikely to be visited by passers-by. On the 19th, in an open space of another small wood on the bank of the same stream, but south of the Montreal road, six specimens of *Amanita muscaria* were found in all stages of growth, from the unexpanded "button" to one with a cap two inches diameter. This was an unusual find, as two severe frosts had occurred at this time, one going as low as 28° Fahr. To protect the specimens from more frost, a pine branch and some dried bracken were placed over them. On the 21st, two of the large specimens had disappeared, without the loose protecting covering being disturbed. Careful search at the base of a pine tree several yards away revealed many fragments of cuticle, about one inch long having the bright orange-red coloring and distinctive scale-like markings of *Amanita muscaria*; also many small broken fragments. On a limb of the same pine, within reach and carefully placed was a portion of the cap, about one and one-half inch square, having the same coloring and scales with teeth-marks apparent at margins and underneath. These fragments were all collected, leaving the base of tree clear. On the 23rd, another large mushroom had disappeared, also without the covering being disturbed. The base of the pine tree was littered with fragments as before, some of these from the cap, and two large pieces, one-half inch to one inch, from the base of the stem. This proved beyond a doubt that a rodent of some kind had been making meals from a mushroom that has been accounted deadly poisonous to human beings, but that apparently caused it no injury.

A short distance from where the *Amanitas* were found, a large colony of the beautiful coral-pink

mushroom, *Hygrophorus pudorinus*, or Blushing *Hygrophorus*, was growing. Some were just appearing through the leaves and pine needles and others at their full size, two inches across. Many of these showed signs of teeth-marks on the caps. On the trees surrounding the mushrooms, five plants were placed in notches of limbs. On returning to inspect the *Amanitas*, these five had disappeared, and seven fresh specimens were inserted in branches and crevices of a stump in such a manner that wind would not blow them away. On the third visit, seventeen fresh specimens decorated the adjacent trees, causing them to appear like Christmas trees. Fifteen of these specimens were *Hygrophorus pudorinus* and two *Tricholoma equestre*. On my next visit only a few were on the trees, but the ground was littered with small fragments and with many eaten on the under side and margins of cap, leaving the stem untouched.

Mushrooms are frequently found during the summer showing teeth-marks on caps; and quite often they may be seen securely fastened in the limbs of trees. Squirrels have been known to eat mushrooms, but the reason for temporarily storing them on limbs of trees is not apparent, since these mushrooms remained only a day or two in the trees and not sufficiently long to be preserved for winter use by drying. The fragments on the trees rule out field mice as culprits; hence, as no chipmunks were observed, but squirrels were many times seen in the vicinity, it may be taken for granted that squirrels ate from both patches of mushrooms.

Possibly frost may have weakened the poisonous properties of *A. muscaria*, or squirrels may be immune to that specific poison.

FIELD WORK IN THE LOWER ARCTIC ZONE

By JAMES C. CRITCHELL-BULLOCK

UPON a return to civilization from any enterprise in the less-frequented parts of the world, more especially when travels have led us to centres of big-game and those regions appealing to the romantic sense of the popular mind, friends, relations and interested persons immediately clamour for some proof of those journeys more concrete than the proffered perusal of a journal, or the inspection of photographs. Material is demanded that appeals each to the individual or aesthetic sense.

No matter which it be, the civilised or the uncivilised, average requests bear a decided resemblance.

But considering the former instance. Generally speaking, the nature and intensity of the interest

taken depends proportionately on two main factors. First, did the traveller gain any notoriety or renown during his investigations? And secondly, did he bring back with him specimens or curiosities from the country in which he voyaged.

In the first instance, the fact of notoriety will go far to replace the prestige lost for his unseemly lack of imaginative reasoning in not returning with full evidence of his work.

But in the second, no matter how exact his descriptions and replete his journal, the facts of his failure to bring out representative collections, or a claim to notoriety, will lower his standing correspondingly with those who visit him for enlightenment on various subjects.

I have seen this little tragedy enacted in no less than twenty different countries. And in this country more than any other, is it frequently apparent.

No part of the continental world is as remote as the interior of Arctic and sub-Arctic Canada, principally on account of the scarcity of native inhabitants. No regions can compare with these for hazard of existence.

No tropical country, central Africa, Tibet, Brazil, or Arabia present such difficulties to the individual naturalist as the Barren Lands of central northern Canada. Yet even in Canada herself, how few appreciate that fact. Indeed, I doubt not that the vast majority are but vaguely aware that 550,000 square miles of continental country lie north of us totally devoid of timber, and except for certain water routes, unpenetrated by man. In fact, to call for a discussion of this vast tract in average European society would serve but to herald a silence as complete as that following some dumfounding declaration of war.

Notwithstanding that many biologists have conducted researches in the lower Arctic Zone, except for occasional gleanings from the stray inhabitants of the country, few winter observations have been undertaken at any time. Moreover, even to-day much information is required on summer subjects.

Occasionally an amateur naturalist, or sportsman, visits the country. During the summer he proceeds apace, but in all probability makes no unusual discovery. Winter draws close and if he decides to remain, builds his camp somewhere in the timber, probably in the neighbourhood of Indians. Once again the results obtained do not come up to expectations either because of inexperience or the fact that he is working only where observations have been previously made.

Expenses are high and unless he has unlimited private means, or is supported by some wealthy institution, a return necessitates the adoption of commercial trapping or trading as a means of reimbursement, and thereafter his duties about camp are so manifold that intensive study is rendered impossible.

Various residents of the country, such as employees of the Hudson's Bay Company have at intervals contributed much to the advancement of the science. MacFarlane is no doubt the most noted of these, but generally speaking the duties of their profession relegate them to life in the immediate vicinity of their posts or the sleigh routes.

During the past year, I have resided entirely within the confines of what is generally termed the Barren Lands proper, and during the whole of the winter of '24-'25 on no occasion made a return to the last woods. Whether I have succeeded in accomplishing what has hitherto never been

recorded I know not, but the experiences and the extreme difficulties encountered have caused me to conclude that I am justified in reproaching those who belittle the endeavours of the individual naturalist when he fails to contribute a certain amount of information, or provide the collections that would appear so simply amassed when account is taken of the investigator's seemingly innumerable opportunities.

Empirical knowledge of Barren Land winter life is essential before just conclusions may be drawn.

Not as in lower latitudes, where porters, canoe-men, and general coolies are to be obtained for a few piastres or annas a day, assistance here is practically, if not quite impossible, to obtain unless it be imported at endless expense. Winter life resolves itself into a struggle for existence no matter how complete one's equipment, or how well stocked with supplies. Portages are numerous, the summer season is limited, and with a minimum of paid assistance only a certain proportion of that stock can be brought up before the close of navigation. Thereafter, exceptional weather disturbances prevent but a very occasional return to the main base (distant perhaps two hundred miles), and that further governed by the success met with in obtaining sufficient fuel, for the number of sleigh dogs is kept rigidly at a minimum on account of the difficulty of procuring feed, the uncertainty of being able to do so, and the vast amount of time and energy expended in such attempts.

Of wood there is none for fuel, it is reasonably certain that little enough can be obtained for building a winter house, much less caches, etc. Again, once the timber is left behind, and the mossy tundra country passed, the nature of the Laurentian Plateau is such that there are little or no peat bogs, or sod banks from which to cut bricks for constructional purposes. Dug-outs and holes in the sand eskers have to be adapted to these purposes. Subsidence is with difficulty provided against, and on occasions does occur, causing not only much labour, but often certain losses. Igloos are out of the question, principally because of unsatisfactory snow conditions, though they are constructed when possible for the dogs.

It may be argued that during winter there is so little movement in the animal world that field work comes practically to a standstill. Such may be the case, but Fall investigations must be progressed with to such a late date, and Spring so soon brings with it a return of life that continued residence is of great importance. In fact, I consider it essential if satisfactory records are to be compiled, and this applies equally to all branches of science which it is desirable to conduct

in a zone where travelling is necessarily confined to the few short months of Spring and Summer.

The Barren Lands are in urgent need of attention. The establishment of trading posts along the coast and northwards on Hudson Bay, splitting up migrational movements, providing the natives with modern firearms and the means of penetrating the interior further every year, is bound to have its effect. Some of the Indians that I have met tell me that they are at a loss to account for the scarcity or lack of game in certain districts, and my own observations lead me to believe that the unnatural innovations of civilization are steadily influencing conditions.

Only those who have learnt to appreciate the country, vast inhospitable wilderness though it is, can realize the pity of it. To imagine the caribou (*Rangifer arcticus*, R.) dispossessed of his magnificent range, reduced from the glory of his massed grandeur to a few straggling bands, the sport of

ravenous wolves; the noble musk-oxen (*Ovibos moschatus*, Zm.) as a single vanguard standing stolidly rump to rump fighting off a pack of dogs, while some thoughtless sportsman hurries up to seal their doom.

And the same with the other mammals. Deprived of their heritage as scavengers to these huge herds, they will mysteriously disappear, traps and poison will claim their toll, starvation the remainder.

A sad picture indeed, but one that I trust will never find place on canvas.

Howbeit the Barren Lands would repay field investigation, and I hope that sufficient interest will be aroused permitting work to be carried out on such a scale that that vast arena comprising almost a sixth of the total area of our country may be known and cherished by all Canadians as the world's greatest game sanctuary.

THE BIRDS OF BIRD ISLANDS, NOVA SCOTIA

By IVAN A. BAYLEY



LYING six miles off shore from Great Bras d'Or entrance, Cape Breton Island, Nova Scotia, is a little group of islands with an interesting bird population that seems to have escaped the attention of ornithologists. An hour's journey by motor from Sydney will take us to our point of embarkation and from there looking to seaward and just northeast of frowning Cape Dauphin we see the Bird Islands lying out to sea in a long, narrow strip.

When we near the islands we find that the south side is comparatively low, rising only some twenty or thirty feet from sea level, and at this side the island can be scaled at some points. On the other hand, the north side of the islands presents a sheer cliff of sixty to eighty feet, beneath which rises a great talus of the large, thick slabs of millstone-grit and soft sandstone—composing the islands. These are piled criss-cross in all directions. We land on Hertford Island.

It is easy to land in fine weather among these rocks and to scramble over and under them, or to jump from ledge to ledge for a short distance. It is not possible to travel far along the shore in this way without again embarking to reach the next cove for there is no continuous beach to travel upon, but every here and there deep green waves roll right up to the cliff base.

It is easier to watch all the performances in a six-ring circus than to observe all the bird happenings while we scramble along this rough shore line, which is flanked with tall perpendicular cliffs of

sandstone that are whitewashed, in many places, with the droppings of the nesting sea-birds.

The next or outer island is Hiboux, and on this is the revolving light which marks these rocks. It has an easier landing place than the first island because this is kept up by the lightkeeper. Along the cliffs of this island, conditions are similar to those on Hertford Island, the sea being dotted with flocks of feeding Puffins, Razor-bills, Murres and Guillemots, which may be seen in companies of from twelve to one hundred on the sea or flying in a dizzy maze backward and forward from their lofty little cliff dwellings. The large rock slabs and detached rock islets along the low southeastern side of the islands are used as a sunning ground for Puffins, Razor-bills, Guillemots and Cormorants. Here in the quiet sunny pools, the young birds learn to swim and to fish, while in the glittering summer sea, a few yards off shore, larger flocks of the older birds love to disport themselves. Sometimes the low flat shelving rock, which here in some parts has been washed clear of turf covering, will appear like a patch of snow, being literally covered by Terns. Quite a number of Guillemots, Puffins and Razor-bills nest along these low cliffs also, though the Guillemots seem to predominate.

VEGETATION:

On Hertford Island there used to be a few fair-sized spruce and fir trees with trunks about a foot in thickness. These are now dead, but some wind-stunted spruce remain there, growing very thickly, thus supporting themselves against the violent sea

winds, and on this island there is also a considerable patch of a hardy, tough and thorny wild plum. The slope of the islands generally is southeasterly and consists of a regular grassy plain which is carpeted throughout with a very soft fine hay and in parts is thickly interspersed with strawberries. In several places the turf along the upper edge of the cliff supports the thick, matted growth of the Common Juniper, which is a curious-looking creeping shrub, with a foliage closely resembling cedar. The wild blue harebell clings to some of the tiny rock crevices with a precarious foothold and a small patch of crowberry and another of bay laurel or waxberry about complete the vegetation.

INSECTS:

A few potato beetles seem to find their way out here by flying across from the mainland and occasionally the brilliantly colored butterfly, *Papilio brevicauda*, is met with here, it seeming to be confined closely to sea islands along the coast. Mosquitoes and black flies are also in evidence.

BIRDS:

(1) *Gavia stellata*. RED-THROATED LOON.—Immature birds, which are locally called "Corbrace", are occasionally found from October to December. There is no evidence that this species breeds here.

(2) *Fratercula arctica arctica*. PUFFIN.—The Puffins are found roosting on ledges of the rock in small companies, darting in and out of their burrows or coming back from their sea fishing-grounds, which are within a quarter of a mile or so of the island. As they whirl in groups over our boat, their curious over-balanced or top-heavy appearance is noticeable and seems to be caused by the very deep, compressed, and brilliantly coloured bill. Their short tails and bright orange feet spread far apart and, placed far back on the body, give to this little bird an altogether unusual appearance, which brings forth many exclamations of mirth and interest. Once the young are hatched it is a curious sight to see the Puffins carrying in fish for them, for the fish hang crosswise in the absurd-looking bill and are all spaced evenly apart. The Puffins and Razor-bills hollow out similar little nesting caves in the cliffs but the Puffins also occasionally excavate burrows along the edge of the soft turf covering the top of the islands. Puffins arrive at these islands during the last week of April or in early May and leave towards the last of August and, although the islands are only six miles off from the mainland, these birds rarely visit the main, but confine themselves very closely to the island preserves during the summer. There are certainly a thousand Puffins nesting here at present and it is said that in former years, say sixty years ago, they nested here in veritable crowds, associated with Razor-bills,

Murres, and Guillemots. That such a colony of breeding Puffins has persisted in Nova Scotia is unrecorded in the ornithological literature. Audubon (1840) says it bred commonly on the islands in the Bay of Fundy. H. F. Tufts (*O. N.* XXI, 1907, p. 94) records some few as breeding on Sea Island, Yarmouth County, Nova Scotia. H. F. Lewis, MS., states one pair used to breed on Sea Island, but that it has disappeared as a breeding bird and he knows of no record of its breeding there since 1912. H. Bryant (*Proceedings Boston Society Natural History*, VI, pp. 114-123) visited Green Island, Yarmouth County, Nova Scotia, in the summer of 1856, and found one egg. He states the birds are still quite abundant on the islands near Yarmouth. No doubt, as Dr. Charles W. Townsend says (*Life Histories of North American Diving Birds*, p. 89), "it is probable that a century ago the coast swarmed with these interesting birds."

(3) *Cephus grylle*. BLACK GUILLEMOT.—This species nests commonly in the great jumble of rock slabs at the base of the cliff, more particularly towards the western half of each island, and on the high table rock between the two main islands. The hundreds of them there make striking figures with their jet black plumage, white wing patches and scarlet feet. Some allow the boat to approach within a few yards before taking flight, but others leave their nesting ledges for the fishing grounds continuously. There are probably four hundred Guillemot nests on the islands each summer, but it is really very hard to estimate them, as several pairs nest in some of the crevices and many single pairs nest in odd crevices around the islands. Away from the most frequented breeding grounds these birds do not confine themselves strictly to the islands as do the Puffins, Murres and Razor-bills, but may occasionally be found nesting on the cliffs along the mainland coast. They remain on this coast in considerable numbers during the winter, being then in a garb of black or gray and white. The summer plumage of black with white wing patches is assumed in April and they repair to the islands to nest in May. During early April they are sometimes found with a peculiar mixed plumage of the familiar speckled hen or checkered appearance, which is caused by the mature or summer black plumage growing out through this light coloured winter plumage. At this time the white feathers are very loose and easily dropped.

H. F. Tufts (*O. N.* XXI, pp. 236-9) records "Guillemots" nesting on Seal Island, Yarmouth County, Nova Scotia; Bishop (*O. & O.*, 1887, XII—2, gives breeding dates for King's County; while Townsend (*C. F.-N.*, XXXVI, 1922, p. 45) records eight or ten pairs breeding in the cliffs of

Isle Haute, Cumberland County. Thus this appears to be far the most populous colony in Nova Scotia to-day.

(4) *Uria*. MURRE (Species ?).—The Murres are not as numerous as the Puffins and Razor-bills. Probably not more than a dozen pairs are nesting here now, though they are said to have been very plentiful in former years. They nest on the higher ledges, some fifty feet above the water.

(5) *Alca torda*. RAZOR-BILLED AUK.—Rows of Razor-billed Auks can be seen on the permanent cliff ledges, usually about half-way up the cliffs and mostly segregated towards the centre of each island's high north side cliff, though some pairs also nest on the southeast side of Hiboux Island. These Auks sit like soldiers on parade and present gleaming white breasts, while the backs are black and the wings strikingly barred. Another prominent feature is the odd-shaped beak, which is compressed so that the widest part of it is from top to bottom, and there is a striking, clear-cut line of white on the side of the head. The Auks nest on the ledges, and hollow out small caves for themselves in the soft rock by dint of diligent pecking and scratching. As our boat comes up, one lone bird, that might have been a sentinel, is seen sitting on a ledge and then, springing with a Jack-in-the-box expression, a companion will pop out beside him and the two will curiously gaze at the visitors. The new-comer will be followed by another until sometimes seven pop out of the little hole and sit in a row. This interesting occurrence can be observed in many other parts of the islands.

The Razor-bills, locally called "Tinkers" and "Turres", come to the islands in early May and leave towards the last of August. There are probably three hundred pairs nesting here.

There does not seem to be any recent published record of this species breeding in Nova Scotia. H. Bryant found two eggs at Green Island, Yarmouth County, Nova Scotia, and an adult female was caught by a partner—Cabot. This was in the summer of 1856.

(6) *Stercorarius parasiticus*. PARASITIC JAEGER.—An occasional visitor with the Kittiwake in October and November.

(7) *Rissa tridactyla tridactyla*. KITTIWAKE.—Of common occurrence in October and November.

(8) *Larus marinus*. GREAT BLACK-BACKED GULL.—This species visits the islands occasionally and if any are present these are usually to be found on the smaller islets forming the connecting chain between the two main islands. They do not breed here.

(9) *Larus argentatus*. HERRING GULL.—Herring Gulls may be occasionally met as visitors to

the islands. These breed in spruce trees at Morien Head, some forty miles away.

(10) *Sterna hirundo*. COMMON TERN.

(11) *Sterna paradisæa*. ARCTIC TERN.—The graceful Terns nest by hundreds on Hertford Island and also on the high table islet between the two main islands, laying three to five beautifully mottled eggs in soft hollows which they have made in the fine dry grass. It is necessary to walk carefully in going through the Tern colony to avoid stepping on their eggs. One wonders how each bird can pick out its own little set of eggs from the array before us and from such a sameness of grassy surface.

The Terns appear towards the last of May and most of them scatter in a general manner along the coast about the 10th to 20th of August, though a few remain at Bird Islands till quite late, but nearly all leave for the south during early October. There are probably more than one thousand pairs nesting at Hertford Island.

(12) *Oceanodroma leucorhoa*. LEACH'S PETREL.—Leach's Petrel breeds in large numbers on both Hertford Island and Hiboux Island, the birds making their burrows in the soft turf of the island tops wherever there is a little irregularity to give a start. For example, in an old stone wall made of loose flat stones, which have been gathered near the lighthouse on Hiboux Island, the burrows are very numerous. They are often found under stones generally, and particularly on the western end of Hiboux Island, where there is a break or fault in the rock formation. At this break the face of the turf covering offers the birds a splendid chance to burrow. They make a tunnel from one to three feet long and a single egg of creamy white appearance, generously spotted with small brown marks at the larger end, is deposited there. When a Petrel is taken from its burrow, it appears very stupid and if it is put down it will not fly but will crawl back into the hole again. The Petrels have an unpleasant habit of spewing nasty, ill-smelling, reddish fish oil over one's hands. I am inclined to think that both sexes take turns at incubation, as I never found a burrow containing an egg or a young one in which there was not also a parent bird, and I have never found the two parents in a burrow at the same time. The young Petrels, covered with dark gray fluffy down, seem larger than their parents and are grotesque little fellows, for the down projects in tufts beyond the general covering at various parts of their body. None of the Petrels are to be seen in the daytime, but at night one can hear the shrill eerie cries from the islands and then their activities take the place of those of the Puffins and the other birds of the daytime. This species breeds in many suitable localities in the Province.

(13) *Morris bassana*. GANNET.—A few Gannets visit the islands occasionally.

(14) *Phalacrocorax carbo*. COMMON CORMORANT.—Common Cormorants nest on these islands, seeming to mingle freely with the Double-crested Cormorants in matter of choice of nesting sites. It is thought that the nesting of this species is especially interesting, as it is believed that this is the only recently recorded breeding occurrence in the Province of Nova Scotia, and because careful search has now revealed several stations in Canada where this bird is still found breeding, recent authors to the contrary notwithstanding. In this connection, Macoun & Macoun, 1909, quote Downs as follows: "It also breeds on the coast of Nova Scotia".

These Cormorants nest principally on the higher ledges near the cliff top on the northern end of Hertford Island, sixty to eighty feet above the sea. Here the cliff is much whitewashed with the droppings. The nests consist of a flimsy collection of sea weeds placed on a narrow shelf and sometimes two or three are crowded together on the same small ledge. Here three to five long slim pale green eggs, much encrusted with lime from the droppings, are deposited. This limey coating is very uneven and on some eggs almost hides the real greenish color of the shell and gives the egg a rough appearance. It is not easily washed off. The Ravens often dash down and rob these nests of their eggs when the Cormorants are disturbed.

These Common Cormorants are the most numerous in this colony and are distinguished by their whitish throats and white hip patches, and, with specimens in hand, by having fourteen feathers in the tail.

There are many immature birds present from the year previous and at first these are somewhat confusing, but they can be distinguished by the greyish-white underparts.

There are probably one hundred pairs of adult birds breeding here and as many immature roosting on the ledges or fishing around the islets. These birds scatter freely along the coast at the various shag roosts after the breeding season is over and some remain on the coast and among the drift ice all winter.

(15) *Phalacrocorax auritus auritus*. DOUBLE-CRESTED CORMORANT.—The Double-crested Cormorants probably comprise about one-fifth of the colony; the mature birds being distinguished on the cliffs by the orange-green throat coloring and the blackish crests on the sides of the head, and also by the absence of white patches on the hip. Specimens in hand show only twelve tail feathers. It is not easy to distinguish the immature birds of the previous season. In looking at these rows of Cormorants sitting on the top of the cliff like

rows of soldiers it is odd to notice how they hold their mouths open as if panting for breath in the hot sunshine, but on examination of the beak it appears as if the nostril opening externally is very narrow and they can doubtless breathe more easily with the mouth open.

It is believed that this is the first breeding record for the species in Nova Scotia and even records of occurrence are scarce. Townsend (*C. F.-N.*, XXXVI, p. 44) found a few in summer at Advocate, Cumberland County. Mr. H. F. Lewis furnished me with a report which he considers credible, of the nesting of this species in Nova Scotia, although he has no personal testimony in this connection. Mr. John Crowell, of Seal Island, told Mr. Lewis in 1912, that the species formerly nested on a ledge near that island, and Mr. Wm. Archibald, of Antigonish, reported to Lewis in 1913 that these birds still nested at that time near the mouth of Antigonish Harbour.

(16) *Mergus*. MERGANSER (Species ?).—Nesting on grassy slopes of the island. They lay ten to twelve eggs, usually placed under the thick scrubby spruce or ground yew bushes.

(17) *Glaucionetta americana*. GOLDEN-EYE.—Common with the next species in mixed flocks from October to February.

(18) *Glaucionetta islandica*. BARROW'S GOLDEN-EYE.—Common with the previous species in mixed flocks from October to February.

(19) *Harelda hyemalis*. OLD-SQUAW.—This species, locally called "Cock-a-wee", is common throughout the fall and winter, departing for the north about the end of April.

(20) *Histrionicus histrionicus histrionicus*. HARLEQUIN DUCK.—Occasionally small flocks of from four to six individuals are found during November and December.

(21) *Somateria mollissima dresseri*. AMERICAN EIDER.—A common visitor in winter, remaining until April or early May.

(22) *Somateria spectabilis*. KING EIDER.—Of rare occurrence in winter.

(23) *Oidemia americana*. AMERICAN SCOTER.—Common near the islands in fall.

(24) *Oidemia deglandi*. WHITE-WINGED SCOTER.—Common near the islands in fall.

(25) *Oidemia perspicillata*. SURF SCOTER.—Common near the islands in fall.

(26) *Erismatura jamaicensis*. RUDDY DUCK.—Of occasional occurrence in October

(27) *Ardea herodias herodias*. GREAT BLUE HERON.—A few of this species occasionally visit along the cliff base.

(28) *Pisobia minutilla*. LEAST SANDPIPER.—A common migrant in August, occurring in flocks of from ten to fifty individuals.

(29) *Totanus melanoleucus*. GREATER YELLOW-LEGS.—A common migrant, August to October.

(30) *Totanus flavipes*. YELLOW-LEGS.—Common migrant, August to October.

(31) *Actitis macularia*. SPOTTED SANDPIPER.—Nests in grass slopes—three pairs noted.

Hypothetical—*Numenius americanus*. LONG-BILLED CURLEW.—Mr. Daniel Campbell tells me that occasionally they have seen on the island a few very large curlew having a large bill. He knew them as "Turkey Curlews". These large "Turkey Curlews" are also observed occasionally at Scatari Island, which is about fifty miles to the southeast of Bird Island, so the fishermen of Scatari tell me. They say that these long billed birds are not plentiful, but that occasionally a few appear in the early flocks of Hudsonian Curlew. The Long-billed Curlew is believed to have been common at Scatari in former years and I think that older residents would readily recognize it if a few appeared with the Hudsonian Curlew. If it should prove correct that they occur at Scatari now, I see no reason why they should not appear at Bird Island as Mr. Campbell believes to be the case.

(32) *Numenius hudsonicus*. HUDSONIAN CURLEW.—An occasional migrant in August, occurring in flocks of from six to fifty individuals.

(33) *Aegialitis semipalmata*. SEMIPALMATED PLOVER.—A common migrant in August, occurring in flocks of from ten to twenty individuals.

(34) *Arenaria interpres morinella*. RUDDY TURNSTONE.—A migrant, passing through in flocks of from six to twenty in early August.

(35) *Haliaetus leucocephalus leucocephalus*. BALD EAGLE.—A lordly Bald Eagle can often be seen on one of the crags of the islands.

(36) *Corvus corax principalis*. NORTHERN RAVEN.—A few Ravens nest on the cliffs and sometimes the birds become very bold, even stealing fish from the lightkeeper's boat while he is tying the painter to the landing place.

(37) *Ceryle alcyon*. BELTED KINGFISHER.—A few pairs nest here.

(38) *Poæetes gramineus gramineus*. VESPER SPARROW.—Nesting on the grassy slopes—quite numerous.

(39) *Passerculus sandwichensis savanna*. SAVANNAH SPARROW.—Nesting on the grassy slopes—quite numerous.

(40) *Spizella passerina passerina*. CHIPPING SPARROW.—Nesting; quite numerous.

(41) *Junco hyemalis hyemalis*. SLATE-COLOURED JUNCO.—Nesting on the grassy slopes—quite numerous.

(42) *Melospiza melodia melodia*. SONG SPARROW.—Nesting in the low stunted spruce—one pair noted.

(43) *Hirundo erythrogaster*. BARN SWALLOW.—Numerous.

(44) *Irodroprocne bicolor*. TREE SWALLOW.—Numerous.

(45) *Riparia riparia*. BANK SWALLOW.—Nest burrows in the turf along top of cliffs—numerous.

(46) *Dendroica aestiva aestiva*. YELLOW WARBLER.—Nests in the wild plum thicket—two pairs noted.

(47) *Dendroica magnolia*. MAGNOLIA WARBLER. Nests in the wild plum thicket—one pair noted.

Mr. Thomas Stevenson, the lightkeeper, is acting as an Honorary Game Officer and he has a pride in his birds, and I am sure will be glad to help visitors see them. The boat-man is a former lightkeeper, Mr. Daniel Campbell, of Great Bras d'Or. A visit to these little sea-girt islands, the home of hundreds of sea-birds, is well worth while and a study of their home life at close range will greatly increase interest in birds and their protection. It is believed that there is considerable local demand to have this interesting bird life protected fully, perhaps by having the islands made a sanctuary.

OBSERVATIONS ON THE CHINESE STARLING (*ETHIOPSAR CRISTATELLUS*)

By R. A. CUMMINS

URGENT demand for definite information regarding the habits of the Chinese Starling, so called, has prompted me to publish the following data:

I had intended to leave this until a later date, when the results of the examination of a series of stomachs would show conclusively whether or not their presence in British Columbia was desirable.

The results here shown are only to be taken as such part of a series ending with the year 1924,

and the accompanying sketch indicates their furthest distribution at that date.

The date of the arrival of this Starling (*E. cristatellus*) in Vancouver is generally accepted as 1897. No actual record of their introduction is recorded, nor is the number liberated known. It is supposed that no more than a few pairs are the parents of the Vancouver colony. No trace of inbreeding with its resultant albinism has left its mark on the birds of to-day. About the time of the founding of this colony, large numbers of this

species were being imported into European countries and sold by the trade name of "Hill Mynahs". Those sold in Liverpool, England, bringing about twelve shillings each. It is surmised, as there would be no demand for this species as a cage bird in Vancouver at that date, these birds had escaped from some ship, touching at this port or that some irate skipper had tired of his noisy passengers and put them ashore at the first port of call.

Brooks gives the date as 1897, Kermode agrees with this; probably they are correct. It can hardly be conceded that such a conspicuous and noisy bird could live long in a city of a few thousand people, without drawing undue attention.

One point I wish to note at this moment is the absence of literature on this species from the time of its introduction in 1897 until the year 1920, when Kermode wrote a short but admirable report on this Starling (*Annual Museum Report, 1920*—Page 20). At that time the Museum only possessed three skins, and it was not until two years later that the first clutch of eggs reached that institution (*Museum Report, 1922*—page 11, presented by the writer). It is remarkable that such a conspicuous bird, whose economic status is so much questioned, should be allowed a span of twenty-five years unprobed.

Spasmodic complaints of cherry stealing and nest robbing were heard during that time, but the majority of people having no fruit to lose, looked on the new colonists as an acquisition. Possibly had these birds been dwellers on the farm rather than the city, more would have been noted of their habits in the earlier days.

Arriving on the Vancouver waterfront, they established the first roost on the relief work under the cornice of the building at the corner of Cordova and Carrol streets.

This roost is at this date the main resort. From this point they spread out each spring breeding, and for the main part returning with the advent of the fall rains, but in the outlying districts, smaller colonies have been founded. Dry roomy shelters are much to their liking and from the cornices, they serenade the assembled loggers and other out-of-works, who usually frequent this part of the city. This rabble of chatterings and whistling usually starts at daylight and is sometimes carried into the night. The earliest starlings spent much of their time about the old court house grounds two blocks distant. The head of the statue of justice on the dome was a favorite perch so that any one viewing this could not but notice the birds.

The movement of the invaders became as years passed more south and east, noticeably along the main highways. This one lot went to Marpole

via Granville street; one to South Vancouver along Main and Fraser streets; and another to New Westminster along the new Pacific Highway. All nesting cavities along these routes were occupied by the advancing host, probably it was the younger birds that kept the lead. Birds collected on the outposts were usually of the previous year. Outside the city limits, conditions were perfect; market gardens had sprung up on the flats; Chinese gardeners deposited heaps of manure all the year round, to which as offal feeders, they had always access. Just enough dead trees were left standing for them to nest in. Everything seemed suitable towards their increase. It is to be noticed that they followed the cleared land dependent of the hand of man. The dense forests of Point Grey and North Vancouver had no attraction for them.

Their advance is certainly to the south. Those that might go north or east will surely migrate before cold weather to the warmer coastal provinces. In near zero temperatures the birds suffer and resort to the sheltered sides of manure heaps, chimneys, etc., and on wet days much of their time is spent under the eaves.

The nesting of (*E. cristatellus*) occupies parts of the month of May, June and July, eggs being laid in early May. Quite a long period is passed between the arrival of the birds at the nesting site and the actual nesting. At this time, the vocal powers are stretched to the limit. Eggs are usually four, clear blue, deposited on a rude nest composed of coarse straw and feathers, a few primaries from a goose or chicken are usually added, and in most cases such things as blue bags, paper wrappers from candies, and pieces of rubber are to be found in and on the ground below the nest. It is not believed that more than one brood is raised in a season. Birds in the juvenile plumage are rarely collected in late August. Birds in this stage have not the white tips on the tail extremities.

The young on leaving the nest family groups are maintained, families joining together till on about the end of August, some of the flocks may number as many as fifty. During the heat of August, the warmer hours of the day are passed in the shade, the foliage of the Elder trees providing them with shelter, and the berries food.

Unfit for human consumption, and not suitable as a sporting bird, it is seldom molested except in the fruit season when small numbers are shot in suburban gardens. A few birds are also taken by sharp-shin hawks.

One interesting point in their nesting habits is the fact that in many cases when a pair of birds are taken from a nesting-hole, others will resort to it immediately.

The writer collected some sixty birds from two stumps containing eight nesting holes in one season. Much stress must be laid on the fact that they do occupy the nesting sites of more useful birds. We have witnessed them throwing young tree swallows out of nesting boxes in the writer's garden.

The general habit seems to be to take and hold the site for at least a month before the actual nesting begins. It might be mentioned that they now nest as low as ten feet from the ground. This distance is considerably below that of the earlier nesting birds of ten years ago.

An impression one gets is that there are more birds in the district than is actually the case. This is due to the fact that they are so noisy and frequent highways and public grounds, and they never feed long in one place. But should one put himself to the task of collecting any number of specimens, he will soon be convinced that instead of hundreds only tens exist.

From a few pairs in 1897, the colony now numbers some six or seven thousand, being most numerous where they made their debut, and

perhaps spreading now at the rate of one mile each year in the enlargement of their range. Outposts are now within three miles from the International boundary to the south.

Evidently the starlings are omnivorous. Extended investigations over a number of years prove conclusively that they are of no economic value to this province. Taking up work, which has been neglected in the earlier days, and which, in the hope of the writer, may not now be too late to be of value, arrangements were made with the University of California, that the writer prepare and supply stomachs, and Dr. H. C. Bryant conduct the analysis. An average of ten birds per month for the last year have been investigated. The writer has also examined some dozens of stomachs, but owing to several deficiencies, it is not proposed to include these in the scope of this paper.

The following is a brief review of the analysis to date. The series not being complete, no effort is made to arrive at the percentage on a quantity basis, nor will this be done till the monthly quota is materially enlarged. This is intended for 1925.

RESULTS STOMACH EXAMINATION *Ethiopsar cristatellus*
NUMBER OF CHINESE STARLINGS TAKING VARIOUS ITEMS OF FOOD.

Month	Number of Birds	Grain and Fruit	Beetles, Etc.
March	8	4 (oat hulls)	1 (caterpillar) 1 (earth worm)
April	10	8 (oats) 5 (grass)	5 (beetles or other insects)
May	10	4 (oats)	7 (beetles and other insects) 3 (earth worms)
June	10	1 (oats)	3 (beetles and other insects)
July	9	8 (fruits and seeds)	2 (beetles and other insects)
August	10	3 (oats) 1 (fruit) 3 (seeds)	6 (beetles) 4 (Muscidae larvae)
September	10	4 (oats)	2 (beetles) 8 (Muscidae larvae)
October	10	8 (oats and barley)	2 (beetles, etc.) 7 (Muscidae larvae)
November	9	4 (oats) 5 (grass)	
December	4		4 (beetles) 2 (Muscidae larvae)

Identification of the beetles shows most of them to be dung and staphylinid beetles (*Aphedius* Sp.) from manure piles. Two species are common introduced forms. In one instance sap beetles were taken by a bird and in another clover leaf beetles. Of 86 birds, 38 had oats or barley hulls in the stomach; 12 had seeds; 20, grass and leaves; 14 fruit; 16, beetles; 26, insects of some kind; 7, *Acrididae*; 4, spiders; 21, *Muscidae* larvae or pupae; and 4, small earthworms.

This part series of stomachs were taken in the one locality, many of them from the one position, in every case their known feeding grounds were avoided, birds being taken when coming in to rest or at the nesting sites. It being found that stomachs taken during the first hour of the day were invariably empty, no stomachs taken then were used here.

Outstanding in the foregoing list is the number of birds taking oats. All of this is undoubtedly waste, as no oats or barley is cultivated within range and must have come from manure piles or around stables. Still, it should be remembered

that grains would form a large part of their diet when available, and that their colonising farm lands must be looked upon with grave fears.

Not dwelling on the showings of fruit, it is well known that the birds do great damage to cultivated fruits; cherries, apples and black-berries suffer most; whole crops of isolated cherry trees often being taken.

It may also be noted that they seldom partake of the tent caterpillar nor the cut-worm in any of the stages; these insects being most destructive within their range.

Being at the present time wholly dependent on

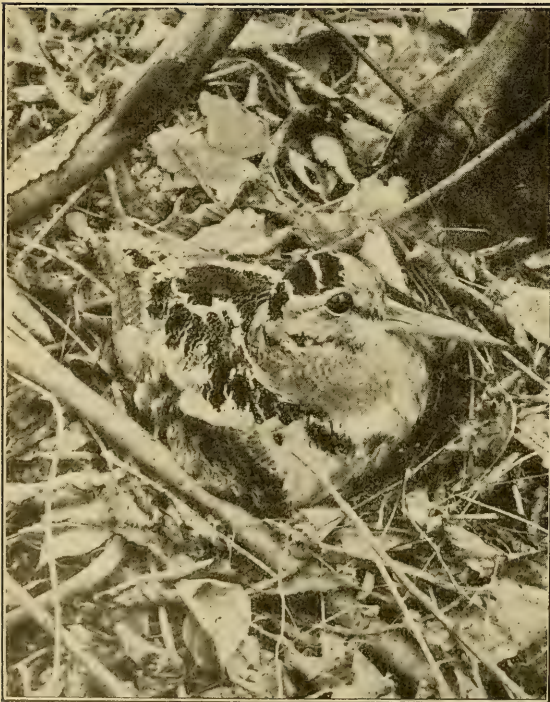
the hand of man for food, there is no reason why the Vancouver colony of starlings could not be exterminated. The annual loss in the economic value of the depleted native birds must be great in this district; a district in which, owing to the depredations of insect pests, all fruit trees must be

sprayed. We need all our insectivorous birds and to these birds the starling is a factor, which is curtailing the increase of those that use cavities for nesting operations.

The writer is convinced that we can and ought to get rid of this menace before it becomes too late.

INTERESTING PHOTOGRAPHS OF NESTING WOODCOCK

*Natural Pose of Woodcock on Nest
March 29, 1925*



We stroked the Woodcock on back and then raised her head and she posed for a photograph. Note image of photographer in bird's eye.



Photographs supplied by W. T. Brown
Westmount, Que.

OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS*

In the following returns upon banded birds, it will be noted that some returns may be thought to indicate, from the date of capture, violations of the Migratory Bird Act of Canada or the United States. The great majority of returns, which seem to indicate violations, are from birds accidentally caught in traps set for fur-bearing mammals, from birds caught in fish nets, killed by oil, or from birds found dead from unknown causes. Appropriate action has been taken in connection with the few returns which indicate illegal shooting.

(Continued from page 171)

RETURNS FROM BIRDS BANDED IN 1914

PINTAIL, No. 590, banded by Alexander Wetmore, at the mouth of the Bear River, Utah, on September 16, 1914, was recaptured near Expanse, Saskatchewan, on April 13, 1916. Reported in the U.S. Dept. of Agriculture Bulletin No. 1145, May 10, 1923.

RETURNS FROM BIRDS BANDED IN 1916

PINTAIL, No. 3748, banded by Alexander Wetmore, at the mouth of the Bear River, Utah, on August 20, 1916, was recovered at Estevan, Saskatchewan, about December 5, 1917. Reported in the U.S. Dept. of Agriculture Bulletin No. 1145, May 10, 1923.

RETURNS FROM BIRDS BANDED IN 1917

CROW, No. 23021 A.B.B.A., adult, banded by B. S. Bowdish, at or near Tabusintac, Northumberland County, New Brunswick, on June 22, 1917, was found dead at Paterson, New Jersey, on October 21, 1924. Reported in *Bird-Lore*, January-February, 1925.

RETURNS FROM BIRDS BANDED IN 1919

BLACK DUCK, No. 36997 A.B.B.A., banded by H. S. Osler, at Lake Scugog, Ontario, on September 12, 1919, was shot at Deloraine, Manitoba, on October 8, 1924.

RETURNS FROM BIRDS BANDED IN 1921

HERRING GULL, No. 100,696, young, banded by Ernest A. Joy, at Little Wood Island, Grand Manan, New Brunswick, on August 18, 1921, was found dead in the same place it was hatched, on September 10, 1924.

MALLARD, No. 37254 A.B.B.A., male, banded by T. Brown, at a small lake near Whitefish, Ontario, during the spring of 1921, was killed at Whitefish Lake, Ontario, on October 6, 1921.

BLACK DUCK, No. 4777, banded by H. S. Osler, at Lake Scugog, Ontario, on September 20, 1921, was shot in the southern part of James Bay, Quebec, about April 30, 1924.

BLACK DUCK, No. 37327 A.B.B.A., banded by H. S. Osler, at Lake Scugog, Ontario, on October 1, 1921, was shot on Hovey's Lake in the extreme southern part of Indiana, on December 9, 1924.

BLUE-WINGED TEAL, No. 4724, banded by H. S. Osler, at Lake Scugog, Ontario, on September 16, 1921, was killed on Lake Traverse, Wheaton, Minnesota, on September 16, 1924.

RETURNS FROM BIRDS BANDED IN 1922

COMMON TERN, No. 104,872, fledgling, banded by Edwin Beaupré, at a place three miles

from Kingston, Ontario, on July 14, 1922, was found alive at Stop 22, Manitou Line, near Rochester, New York, on August 13, 1922. The bird soon died. Reported in the *Bulletin of the Essex County Ornithological Club*, 1922.

MALLARD, No. 102,505, banded by F. C. Lincoln, at Browning, Illinois, on March 8, 1922, was shot at a place twenty-five miles south-east of Camrose, Alberta, about January 25, 1925.

MALLARD, No. 102,695, banded by F. C. Lincoln, at Browning, Illinois, on March 11, 1922, was killed at Kennedy, Saskatchewan, on October 10, 1924.

MALLARD, No. 228,491, female, banded by H. S. Osler, at Lake Scugog, Ontario, on October 8, 1922, was shot on Point Pelee Marsh, Ontario, on November 5, 1924.

MALLARD, No. 230,293, banded by F. C. Lincoln, at the Sanganois Club, Browning, Illinois, on November 20, 1922, was shot in the vicinity of Gull Rock Lake, Ontario, one hundred miles north of McIntosh, Ontario, on April 23, 1924.

MALLARD, No. 230,410, banded by F. C. Lincoln, at Browning, Illinois, on November 22, 1922, was shot near Saltcoats, Saskatchewan, on October 9, 1924.

MALLARD, No. 230,413, banded by F. C. Lincoln, at Browning, Illinois, on November 22, 1922, was shot at a place twenty-five miles south-east of Yorkton, Saskatchewan, on October 24, 1924.

MALLARD, No. 230,528, female, banded by F. C. Lincoln, at Browning, Illinois, on November 22, 1922, was caught in a muskrat trap in a creek near Lake Manitoba, Tautas Aides, Manitoba, on April 21, 1925.

BLACK DUCK, No. 101,134, banded by H. S. Osler, at Lake Scugog, Ontario, on August 18, 1922, was re-caught at the same place on August 31, 1922, and was killed near Chicoutimi, in the County of Chicoutimi, Quebec, on July 8, 1924.

BLACK DUCK, No. 101,195, banded by H. S. Osler, at Lake Scugog, Ontario, on August 24, 1922, was killed by an Eagle at Dahlgren, Virginia, during the months of January or February, 1924. The Duck was in a crippled condition when attacked.

BLACK DUCK, No. 101,290, banded by H. S. Osler, at Lake Scugog, Ontario, on August 31, 1922, was shot on Grand Island, Mason County, Illinois, on October 30, 1924.

BLACK DUCK, No. 207,549, banded by H. S. Osler, at Lake Scugog, Ontario, on September 12, 1922, was killed in the same locality during the fall of 1924.

BLACK DUCK, No. 207,626, banded by H. S. Osler, at Lake Scugog, Ontario, on September 18, 1922, was killed on the Savannah River, Georgia, about March 10, 1925.

BLACK DUCK, No. 207,642, banded by H. S. Osler, at Lake Scugog, Ontario, on September 19, 1922, was killed in Lakes District Marsh, Lower Dorchester County, Maryland, on December 5, 1924.

BLACK DUCK, No. 207,771, banded by H. S. Osler, at Lake Scugog, Ontario, on September 22, 1922, was caught in a trap on the shore of Ostoboning Lake, Quebec, during the month of May, 1924.

*Published by authority of the Canadian National Parks Branch, Department of the Interior, Canada.

BLACK DUCK, No. 207,933, banded by H. S. Osler, at Lake Scugog, Ontario, on September 29, 1922, was shot in the marsh of Eastern Branch, Washington, District of Columbia, on January 5, 1925.

BLACK DUCK, No. 207,942, banded by H. S. Osler, at Lake Scugog, Ontario, on September 30, 1922, was shot in the Township of Ops, Victoria County, Ontario, on September 2, 1924.

BLACK DUCK, No. 228,432, banded by H. S. Osler, at Lake Scugog, Ontario, on October 7, 1922, was shot near Bloomfield, Ontario, on September 1, 1924.

BLACK DUCK, No. 228,441, banded by H. S. Osler, at Lake Scugog, Ontario, on October 7, 1922, was killed on the Tennessee River, near South Pittsburg, Tennessee, on January 27, 1925.

BLACK DUCK, No. 228,483, banded by H. S. Osler, at Lake Scugog, Ontario, on October 8, 1922, was killed in Dorchester County, Hollands Island, Maryland, about January 25, 1925.

BLACK DUCK, No. 228,488, banded by H. S. Osler, at Lake Scugog, Ontario, on October 8, 1922, was killed near Scottsboro, Alabama, during the month of January, 1925.

BLACK DUCK, No. 102,991, banded by H. K. Job, at Amston, Connecticut, on October 10, 1922, was captured in the woods several miles north of Bergeronnes, Quebec, on May 6, 1925.

BLACK DUCK, No. 228,522, banded by H. S. Osler, at Lake Scugog, Ontario, on October 13, 1922, was shot on Deals Island, Somerset County, Maryland, on January 19, 1925.

BLACK DUCK, No. 228,588, banded by H. S. Osler, at Lake Scugog, Ontario, on October 20, 1922, was killed at Lloyds, Maryland, on January 8, 1925.

BLACK DUCK, No. 228,603, banded by H. S. Osler, at Lake Scugog, Ontario, on October 21, 1922, was killed in Westmoreland County, on the Potomac River, near Popes Creek, Virginia, on January 5, 1925.

BLACK DUCK, No. 228,687, banded by H. S. Osler, at Lake Scugog, Ontario, on November 11, 1922, was killed on the Sassafas River, Kent County, Maryland, on January 27, 1925.

BLUE-WINGED TEAL, No. 207,575, banded by H. S. Osler, at Lake Scugog, Ontario, on September 14, 1922, was killed at Wakenda, Missouri, on October 3, 1924.

BLUE-WINGED TEAL, No. 207,588, banded by H. S. Osler, at Lake Scugog, Ontario, on September 14, 1922, was killed near Reserve, St. James Parish, Louisiana, on November 20, 1924.

PINTAIL, No. 228,650, banded by H. S. Osler, at Lake Scugog, Ontario, on October 30, 1922, was shot on Lake Maria, Murray County, Minnesota, on September 30, 1924.

PINTAIL, No. 228,652, banded by H. S. Osler, at Lake Scugog, Ontario, on October 31, 1922, was killed at Churchill, Manitoba, during the month of August, 1923.

RETURNS FROM BIRDS BANDED IN 1923

MALLARD, No. 102,132, female, banded by Allen Green, at Oakville, Iowa, on March 21, 1923, was found dead in a slough with a rat trap on its foot in the north-east quarter of Section 28, Township 27, Range 13, West of the Second Meridian, Saskatchewan, during the first week of April, 1925.

MALLARD, No. 297,710, female, banded by H. S. Osler, at Lake Scugog, Ontario, on October 21, 1923, was shot on the Cumbahee River, South Carolina, on November 27, 1924.

BLACK DUCK, No. 297,375, banded by H. S. Osler, at Lake Scugog, Ontario, on October 6, 1923, was trapped in a muskrat trap on a river running through the north half of Lot 4, Concession 6, Township of Bryce, Temiskaming, Ontario, on April 13, 1925.

BLACK DUCK, No. 297,391, banded by H. S. Osler, at Lake Scugog, Ontario, on October 8, 1923, was killed on Lake Washington, Washington County, Mississippi, on November 19, 1924.

BLACK DUCK, No. 297,406, banded by H. S. Osler, at Lake Scugog, Ontario, on October 9, 1923, was shot on James Bay, near the Attawapiskat River, Ontario, during the month of May, 1924.

BLACK DUCK, No. 297,415, banded by H. S. Osler, at Lake Scugog, Ontario, on October 9, 1923, was killed at a place ten miles east of Guntersville, Alabama, about five miles from the Tennessee River, on December 23, 1924.

BLACK DUCK, No. 297,433, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was killed at Highgate Springs, Vermont, on October 8, 1924.

BLACK DUCK, No. 297,444, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was killed at Back Bay, Virginia, on November 18, 1924.

BLACK DUCK, No. 297,445, banded by H. S. Osler, at Lake Scugog, Ontario, on October 11, 1923, was killed at Little Woods, Louisiana, on November 20, 1924.

BLACK DUCK, No. 297,681, banded by H. S. Osler, at Lake Scugog, Ontario, on October 13, 1923, was killed in Sandy Island Bay, about forty-five miles north of Cape Charles, Virginia, on November 20, 1924.

BLACK DUCK, No. 297,711, banded by H. S. Osler, at Lake Scugog, Ontario, on October 22, 1923, was killed at Oatka Creek, Wheatland, County of Monroe, New York, on November 28, 1924.

PINTAIL (?), No. 297,377, banded by H. S. Osler, at Lake Scugog, Ontario, on October 6, 1923, was shot in Cedar Point Marsh, near Sandusky, Ohio, on November 15, 1924.

BRONZED GRACKLE, No. 109,951, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 1, 1923, was caught in a granary at Kenaston, Saskatchewan, on August 4, 1925. The band was removed and the bird released.

RETURNS FROM BIRDS BANDED IN 1924

MALLARD, No. 203,854, male, banded by L. V. Walton, at Cuivre Island, Missouri, on February 26, 1924, was shot at Hastings Lake, Alberta, thirty-two miles east of Edmonton, on October 4, 1924.

MALLARD, No. 232,692, banded by John Broeker, at Portage des Sioux, Missouri, on February 26, 1924, was shot at McNutt, Saskatchewan, about October 16, 1924.

MALLARD, No. 231,950, female, banded by Clarence E. Chapman, at Oakley, Berkeley County, South Carolina, on February 29, 1924, was found dead upon its nest in the north-east quarter of Section 34, Township 47, Range 31,

West of the Fourth Meridian. Alberta, on May 13, 1925.

MALLARD, No. 205,097, banded by L. V. Walton, at Cuivre Island, Missouri, on March 3, 1923, was killed in Indian Reserve No. 29, Township 53, Range 6, West of the Second Meridian, Saskatchewan, on October 18, 1924.

MALLARD, No. 296,789, banded by L. V. Walton, at Cuivre Island, Missouri, on March 22, 1924, was shot at Middle Lake, Saskatchewan, about November 20, 1924.

MALLARD, No. 296,848, female, banded by L. V. Walton, at Cuivre Island, Missouri, on March 26, 1924, was caught in a rat trap in Section 1, Township 61, Range 26, West of the Third Meridian, twenty miles east of the Fourth Meridian, and one hundred miles north-east of Lloydminster, Saskatchewan, on April 25, 1925.

MALLARD, No. 296,677, banded by L. V. Walton, at Cuivre Island, Missouri, on March 30, 1924, was found unable to fly in Section 7, Township 40, Range 28, West of the Second Meridian, Saskatchewan, on November 29, 1924.

MALLARD, No. 296,699, banded by L. V. Walton, at Cuivre Island, Missouri, on March 30, 1924, was shot at Balgonie, Saskatchewan, on September 17, 1924.

BALDPATE, No. 202,942, male, banded by J. G. Cunningham, on Lulu Island, British Columbia, on April 2, 1924, was killed on Lulu Island Foreshore, British Columbia, on January 9, 1925.

PINTAIL, No. 208,103, female, banded by J. G. Cunningham, on Lulu Island, British Columbia, on March 16, 1924, was killed near Cordova, Alaska, about October 23, 1924. Reported in *Bird-Banding Notes*, No. 14, April 15, 1925.

CALIFORNIA QUAIL, No. 260,936, banded by G. D. Sprot, at Mill Bay, Vancouver Island, British Columbia, on January 8, 1924, repeated on March 18, 1924, and was found dead near the telephone line in the same locality on March 22, 1924.

SCREECH OWL, No. 226,136, banded by D. A. Matheson, at Leamington, Ontario, on March 15, 1924, was found dead at Belles Point, on Lake Erie, a short distance from Leamington, on June 10, 1924.

BLACK-CAPPED CHICKADEE, No. 83,555, banded by R. H. Carter Jr., at Muscow, Saskatchewan, on January 14, 1924, was accidentally caught and froze to death on January 24, 1924, in the same locality.

(To be continued)

NOTES AND OBSERVATIONS

NOTICE OF MOTION TO AMEND THE CONSTITUTION.—Notice is hereby given that the following resolution respecting an amendment to the Constitution of the Ottawa Field-Naturalists' Club will be presented to the Annual Meeting of the Club, 1926, for such action as then may be decided.

WHEREAS Article IV of the Constitution of The Ottawa Field-Naturalists' Club as amended, provides that the annual membership fee shall be one dollar and fifty cents, and

WHEREAS this fee has been found inadequate to meet the expenses of the Club in publishing *The Canadian Field-Naturalist*, the deficit having been made up by donations of money, sale of back numbers, and the use of interest on trust funds, and

WHEREAS a slight increase in the annual fee would allow needed improvement in our publication in the matter of quality of paper, illustrations, and in other ways, therefore

BE IT RESOLVED that the words "one dollar and fifty cents" be deleted from Article IV of the Constitution, and that the words "TWO DOLLARS" be substituted therefore.

HOYES LLOYD R. E. DELURY.

Lymnæa (*Bulimnæa*) *megasoma* Say.—While at Cobalt, on September 24th of the present year, an hour or two of leisure was utilized to visit Sasaginaga Lake, north-west of the town, in the hope that it would afford specimens of this remarkable mollusc, which, twenty years ago, was common in Cobalt Lake itself, but, unfortunately, not collected in quantity before the waters became defiled.

My expectations were more than realized. Large shells were to be seen on dense beds of a small-leaved potomageton in a sheltered bay, and

several were easily secured. This, however, was but a prelude. In old prospect trenches, south-east of the lake, and parallel to the shore, the shell appeared in hundreds.

They were not as large as those in the lake, being apparently produced from eggs of the previous year, while the lake shells found were three to four years old; but they were in most cases more than 30 mm. in length, and in perfect condition. Large suites were easily collected and are now available for distribution.

L. megasoma is unique in the lymnæan phylum. No pond snail found anywhere resembles it in shape or approaches it in lustre and richness of colour. Its only rival in size and elegance of form is *L. stagnalis* as found in autumn in Brown's Inlet, Ottawa, and elsewhere in the Rideau Canal. The types of *megasoma* now in the museum of the Academy of Sciences, Philadelphia, were presented in 1823 by Dr. John J. Bigsby to Thomas Say, the naturalist attached to Long's Expedition. Say's description appears on page 11 of the appendix to Keating's *Narrative* and his figure on plate XV of the same work. The locality is stated to be "Bois Blanc Lake, N.W.T." This lake, as I am informed by Mr. Douglas, of the Geographic Board, is in the Rainy River District, and is now known as Basswood Lake. While *stagnalis* is found circum-boreally in Asia and Europe as well as in America, *megasoma* ranges only from Central Canada northerly and westerly as far as the Nelson and through the Northern United States from Lake Champlain to Minnesota, with a few outliers

southward in Ohio and Iowa. Near Ottawa it has been found sparingly in but two localities—in Meach Lake, north of the Tilley Cottage, and in the McGoeyp pond, east of that lake. An immature shell from Meach Lake, which I presented to the U.S. National Museum at Washington is remarkable for having a broad, spiral band on the body whorl. Whiteaves has recorded the species from a pond on Nuns' Island, Montreal, and there is an old record somewhere by Bell of its occurrence at Hawkesbury. I have found it in the Georgian Bay, in Lake Temagami, and elsewhere northward, but never until recently in quantity.

Its occurrence in waters so easily accessible as the Cobalt Sasaginaga Lake (there are many lakes so named in Canada), is of importance owing to the rarity and beauty of this unique species.—F. R. LATCHFORD.

ROBINS EATING SALMON FRY AT ANDERSON LAKE, BRITISH COLUMBIA.—Salmon of several species spawn along the shore of Anderson Lake in certain gravelly reaches where seepage occurs, while similar locations lacking this condition are ignored. The eggs are deposited in nests, roughly eighteen inches in diameter, which have been scooped out by the male fish. After the eggs are fertilized, these nests are covered level with the surrounding lake bottom. Spawning takes place in the late autumn when the lake level is relatively high and later on, when the water recedes, portions of the spawning beds are left high and dry as far as surface water is concerned. But the seepage through gravel and sand, which attracted the fish to that particular spot, keeps the eggs moist and prevents freezing. It frequently happens that when fry emerge the nests are some distance from the water so there the small fish remain, heads close to the surface of the gravel, until liberated by the rising water. In early spring these nests may easily be located through the actions of Crows, Blackbirds, Robins and Varied Thrushes in rolling aside the loose gravel to reach the fry below. Some nests which have been thus despoiled are marked with bird droppings and so made conspicuous.

The above information was submitted by Mr. Alexander Robertson, who was in charge of the Dominion Fish Hatchery when I visited Anderson Lake on May 11th, 1921.

It was then too late in the season to make extensive observations, the bird migration being practically over and most of the salmon nests covered by the rising water. At that late date, also, insect life was sufficiently abundant to offer counter attractions to the birds referred to. The only salmon nest located contained approximately 200 Dog-salmon fry; this was partly uncovered and

kept under observation for several hours. During this time only one bird appeared—a Robin. He hopped into the centre of the nest and fed eagerly on the small fish, seizing them by the middle and swallowing them head first.—J. A. MUNRO.

MEADOWLARK AT ENGLEHART, ONTARIO.—On May 31, 1925, while travelling north on the T. & N.O. Railway to Cochrane, a singing Meadowlark was heard by L. L. Snyder and the writer at Englehart, while the train was stopped there. Englehart is about 120 miles north of North Bay.

This seems to be the most northerly record in Ontario for *Sturnella magna*, although it will probably be found as far north as Cochrane, where suitable open country and farm-land occurs.—JAS. L. BAILLIE JR., *Royal Ontario Museum of Zoology, Toronto, Ontario.*

ABNORMALLY LARGE CLUTCHES OF EGGS OF SHORT-EARED OWL (*Asio flammens*).—I have had the pleasure, during the present breeding season, of inspecting the nests of seven pairs of Short-eared Owls. Each nest contained the unusually large number of nine eggs. In past years, six eggs is the largest number I have seen.

The present year has also witnessed a very large increase in the number of Short-eared Owls nesting in this district, and this increase has occurred at a time when the Short-tailed Field Voles have been unusually plentiful. Have readers of the *C. F. & N.* in other parts of western Canada noticed a similar increase in numbers of birds and eggs?—T. E. RENDALL.

HARRIS'S SPARROW IN CASTOR, ALBERTA, DISTRICT.—On May 15th, 1925, while working in the field, I saw a small bird skulking in a pile of brush. Following my usual custom, I walked across to investigate and found, to my surprise and delight that it was a male Harris's Sparrow (*Zonotrichia querula*). I shot the bird and sent it to Prof. Rowan, University of Alberta, for identification and preservation. Unfortunately, the hot weather and the delay in the mail resulted in the bird being spoiled.—T. E. RENDALL.

NOTES OF INTEREST FROM CASTOR, ALBERTA, DISTRICT.—LEWIS'S WOODPECKER (*Asyndesmus Lewisi*).—On May 7th, 1924, I observed two Crows harassing a smaller bird which resembled very much the European Jackdaw. Two days later I again saw this bird, this time at close quarters, and at once realized that it was a strange Woodpecker. I shot the bird, which was sent to Edmonton for identification and proved to be a female Lewis's Woodpecker.

LAZULA BUNTING (*Passerina amœna*).—On

May 26th, 1924, I shot a male Lazula Bunting. The bird was alone and feeding on the seeds of Lamb's Quarter, by a roadside.

PINE WARBLER (*Dendroica vigorisi*).—On June 5th, 1925, accompanied by Prof. Rowan, of the University of Alberta, while searching a poplar bluff, on my farm, for Warblers, our attention was attracted by a strange song. The singer was eventually shot by Prof. Rowan and proved to be a male Pine Warbler.

VARIED THRUSH (*Ixoreus naevius naevius*).—A male in fine plumage was shot by me on September 11th, 1923. The bird was hopping and scratching on the ground under a small group of Poplars.

ADDITIONAL NOTE ON LEWIS'S WOODPECKER.—On May 9th, 1924, I saw two of these birds together and watched them for about an hour.—T. E. RENDALL.

Lectures and Demonstrations—Sixth Winter Session, 1925-6

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Oct. 5th—General	Sectional Demonstrations and Social	
Oct. 12th—Entomology	How Insects are Controlled by Birds	W. D. Bird, B.Sc.
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Oct. 26th—Ornithology	Further Light on the Crow and Magpie	V. W. Jackson, M.Sc.
Nov. 2nd—Geology	Evolution and Geology	A. H. R. Buller, Sc.D.
Nov. 16th—Entomology	Bees and Wasps	Ferris Neave, B.Sc.
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Nov. 30th—Ornithology	Five-Minute Sketches from Members' Note Books	
Dec. 7th	Natural History Survey of Vic. Beach	By Members.
Dec. 14th	Natural History Survey of Vic. Beach	
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Jan. 11th	Open Date	
Jan. 18th—Botany	Leaf Modifications	Miss G. Cameron, B.A.
Jan. 25th—Ornithology	Cormorant Islands of Lake Manitoba	A. B. Gresham.
	Some Notes on Flight	R. M. Thomas.
Feb. 1st—Geology	How Minerals are Formed	F. M. Oliver.
Feb. 8th—General	Marine Work on the Western Coast	C. H. O'Donoghue, D.Sc.
Feb. 15th—Botany	Robber Plants	C. W. Lowe, M.Sc.
Feb. 22nd—Ornithology	The Delights of Bird Study	T. J. Porte.
	Origin of Bird Names	B. W. Cartwright.
Mar. 1st—Geology	Structures in Rocks	J. S. DeLury, Ph.D.
Mar. 8th—Entomology	The Greatest War	J. B. Wallis, B.A.
Mar. 15th—General	Some Manitoba Mammals	H. M. Speechly, M.D.
Mar. 22nd—Ornithology	Birds of Northern Lake Winnipeg	L. E. McCall.
	Gleanings from Bird Land	A. G. Lawrence.
Mar. 29th—General	Amid South Sea Isles	Lt.-Commander H. B. Weston, R.N.R.
April 12th—Entomology	Household Insects	G. Shirley Brooks.
April 19th	Open Date	
April 26th	Annual General Meeting	

BOOK REVIEW

ROOSEVELT WILD LIFE BULLETIN, Volume 2, No. 4, Volume 3, Nos. 1 and 2.

These three bulletins, issued by the Roosevelt Wild Life Forest Experiment Station of the New York State College of Forestry, Syracuse, N.Y., maintain the high standard set by previous numbers, and the Director, Dr. Charles C. Adams, is to be congratulated on the content and appearance of these publications.

In Volume 2, No. 4, the following papers are presented—*The Relation of Wild Life to the Public*, by C. C. Adams; *Big Game Animals of the Yellowstone*, by Edmund Heller; and *The Food of Trout in Yellowstone National Park*, by Dr. R. A. Muttowski. In the first paper, Dr. Adams discusses matters which are of fundamental importance not only for the administration of national parks but for the conservation of many forms of wild life in North America. He points out that a definite and well-thought-out policy must be substituted for the present diverse and more or less

haphazard methods in the control of national parks, and he sees the need of the permanent employment of specially trained naturalists in park work. "The time has come when we must begin an educational campaign for large endowments for the educational and scientific work in our National and State Parks. Of course, much can be done by co-operation with various individuals, the colleges, universities and scientific societies. But it is likely to take some time for these institutions to become acquainted with this phase of work, as most of them, even to-day, have but a faint realization of out-door biological problems and their application to parks. Fortunately, there are a few marked exceptions".

In the second paper of this number, Mr. Heller gives an excellent account of the big game animals of the Yellowstone Park and explicitly states what is needed for their welfare. The spirit of this paper may be summed up in his succinct statement: "What a National Park should in general

aim to be is a balanced piece of nature, where we see nature as it was before the coming of the white man, with no foreign species of animals inserted and no native ones excluded”.

The third paper by Dr. Muttkowski is a very good discussion of the ecology of the cut-throat trout in the Rocky Mountain streams.

Volume 3, No. 1, is a handbook of *The Birds of the Yellowstone National Park*, by Milton P. Skinner, in which the birds are grouped by their

habitats, and field identification notes of the various species are given. It is excellently illustrated, both by photographs and by four very well executed coloured plates by E. J. Sawyer.

Volume 3, No. 2, is a monograph on *The Muskrat in New York*, by Dr. C. E. Johnson, which presents more information on this species than has ever been brought together before, and is a valuable contribution to North American mammalogical literature.—A. B. K.

PUBLICATIONS RECEIVED

Bulletin de la Ligue Francaise pour la Protection des Oiseaux No. 4—Octobre 1925. Paris.

Le Gerfaut, Revue Belge L'Ornithologie. Bruxelles-Laeken.

The Flight Activities of the Honeybee, by A. E. Lundie. Bulletin No. 1328. United States Department of Agriculture Washington, D.C.

The Audubon Bulletin. Summer, 1925. Published by the Illinois Audubon Society.

Journal of Elisha Mitchell Scientific Society. Vol. 41. September, 1925. Chapel Hill, N.C., U.S.A.

Observations on the Ethnology of the Sauk Indians, by Alanson Skinner. Bulletin of the Public Museum of the City of Milwaukee.

Status of the Pronghorned Antelope, 1922-1924, by Edward W. Nelson. Bulletin No. 1346, United States Department of Agriculture.

A Review of the Cirripedia of the Coast of British Columbia, with Glossary, and Key to Genera and Species. By Ira E. Cornwall, F.G.S.

Shell-Mounds and Changes in the Shells Composing Them By Edward S. Morse. Salem Massachusetts.

Brooklyn Museum Science Bulletins, Vol. 3, No. 3, and Vol. 3 No. 4.

Books and Periodicals on Zoology. Henry George Fiedler New York.

Homes for Birds. Farmers' Bulletin No. 1456, U.S. Department of Agriculture, Washington, D.C.

Ford News. July, August, and September. Ford, Ontario.

Monthly Letter of the Royal Bank of Canada. Montreal.

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NESTING OF THE CANADA GOOSE IN A TREE

By D. W. DAVISON

WHILE I was on patrol in the central part of Buffalo National Park, Wainwright, Alberta, early in May, I found a Canada Goose sitting upon an old Hawk's nest in one of the Aspen trees of a deep coulee. The nest was about twelve feet from the ground. A good photograph was taken of the bird on the nest, but when a closer approach was attempted, the bird flew away to a small pond about a quarter of a mile off. It was possible to get a look into the nest by lashing two ladders, and it was seen to contain six eggs just peeking through a lining of fluffy down. I wondered how the young goslings would get down from the tree, and decided to watch as closely as possible to learn what would happen. The nest was visited on Sunday, May 31st, on which occasion the goose flew off honking loudly, circled overhead and returned almost immediately to the nest. She was followed by her mate and together they made a terrible fuss, being evidently much annoyed by the disturbance. The ladder was put up again, and it was found that two of the eggs were chipped and that all would probably be hatched in the course of a few hours.

Early on the morning of June 1st, I returned and, using a stiff northwest wind as protection, approached the nest from the southeast, lying in wait all forenoon, but the Goose never stirred. The Gander came flying to the nest several times, and at about 11.30 A.M. he discovered the watcher and immediately indulged in a most remarkable exhibition, thought to be meant to warn his mate of the presence of an enemy. He would sweep down within a few feet of my head, honking frantically. As it was seen that further attempts to observe events in the Goose family were next



to useless, I returned to camp and brought back some visitors with me. As the party approached the nest, the mother Goose flew off and the tiny heads of the young birds that were then looking over the edge of the nest could be seen from the ground. The parent birds remained on a knoll, about 150 yards off, honking loudly, and finally both of them flew back to the nest. The mother Goose landed on the ground below the tree and the other circled overhead, sweeping down occasionally on the watchers in an unfriendly manner. The mother Goose called softly and a little bit of fluff tumbled over the side of

the nest and fell lightly to the ground. The youngster then scampered unhurt under her wing for protection. She called again and the process was repeated until the fifth, which proved to be the last of the flock of fledglings, was safely established under her wing. Then she started heading the parade for the nearest water-hole, which was a quarter of a mile off. She would go ahead, calling quietly, and the little ones toddled after her. The male did his part by limping off in the opposite direction, apparently carrying a lame wing. He finally returned to the family and brought up the rear of the procession. They reached the slough safely and the family was reared there in due time. More than two hundred visitors to the park saw the mother bird sitting on its nest in the tree.

It is recognized that it is not always possible to tell the male from the female Goose, but in recording this story I have put down the male and female according to what I felt was the truth, and I feel sure there has been no error. When the pair are together the male and female are easily



distinguishable, and especially so during the hatching season. At this time the male bird's plumage is very sleek and orderly, while the female has a rather bedraggled look, since she plucks

most of the down and feathers from her breast to line the nest. The voice of the two birds is so different that I usually have no difficulty in distinguishing one from the other, even at a distance.

BIRD-BANDING IN TOWNSEND'S LABRADOR

By HARRISON F. LEWIS

A paper read at the 43rd Stated Meeting of the American Ornithologist Union, New York, Nov. 10-12, 1925



IN 1915, that well-known and enthusiastic bird-bander, Dr. Charles W. Townsend, of Boston, sailed in a small schooner along the southern shore of the Labrador Peninsula from Natashquan to Bradore, investigating the fauna and flora of that little-known region, questioning and photographing the natives, and bathing daily in the icy waters of the northern Gulf of St. Lawrence. In attaining the objects of his journey he did not hesitate to navigate the narrow channels among the islands and to penetrate to the inner recesses of the bays, and he has published a delightful and well-illustrated record of his labors. From this we learn that he it was who inaugurated bird-banding on this coast by banding a number of young Great Black-backed Gulls, from which at least one return record was obtained. We consider that this alone—for it was an epoch-making event, as all bird-banders will agree—fully justifies the term, "Townsend's Labrador", which appears in the title of this paper, and which may be expected to supplant the older term, "Audubon's Labrador", because

Audubon failed to band any birds here and didn't like the place, anyway.

It has fallen to our lot to continue the work which Dr. Townsend so nobly began, and some of the most interesting features of it will be described forthwith. This is partly because every bird-bander writes a paper like this, and partly because some of these experiences differ from any which we have seen described elsewhere.

Picture to yourselves a large rock or small island of smooth reddish-brown granite, peopled by a thousand Double-crested Cormorants and giving forth a vile odor, which only the naturalist prefers to the smell of an automobile exhaust. The sea being smooth, we are able to land and walk among the basket-like nests, taking great care not to slip and fall in the paste underfoot. Crowds of black young raise their heads all about us, their long necks and distended pinkish throat-sacks giving them the appearance of snakes or of beautiful flowers, according to your fancy. The older, feathered ones edge away and may take to the water, but the younger, woolly ones generally

hold their ground, screeching shrilly, and are fair game for the bird-bander. Many of them, in an excess of politeness, deposit their most recent meal before us. Disregarding this, we feint at the nearest bird with our right, seize its head with our left, and are soon engaged in putting a numbered bracelet about its massive leg, while its great, flabby webbed foot holds our left little finger in friendly fashion. A large colony of these unlovely, though uninjurious, birds is a real test of bird-banding enthusiasm.

Their relatives, the Common Cormorants, nest on a dizzy cliff where most of their nests are inaccessible. Three young were banded here in 1923 and, as one of these birds happened to be shot during the following winter, this species has the proud record of $33\frac{1}{3}\%$ of returns from the birds banded. Few other birds can equal this.

Young Gulls of various species still form the majority of the birds banded along this coast, as in the days when Dr. Townsend first used them for this purpose. They are very attractive and interesting creatures, especially before they are feathered, and they are comparatively easy to catch, as they generally prefer hiding to running. The species banded in Townsend's Labrador include the Herring Gull, Ring-billed Gull, Great Black-backed Gull and Kittiwake. Imagine yourselves on another rocky islet, enveloped in a soft, damp fog, which shuts out all the great unfriendly world beyond the islet and leaves you quite alone with fifty young Great Black-backed Gulls and one thousand million black flies and mosquitoes. You do not have to search for the insects—they will come to you at once and you are sure to notice them—but to find the huge young Black-backs you must look carefully among weeds and tall grass and piles of boulders. When dragged out to be banded, they may be gentle as lambs or may bite and scratch like the Old Nick, according to their several dispositions. Generally all the young birds in one family act more or less alike. If you leave them on their backs, with their feet pointing skyward, they may remain there quietly for a long time—perhaps till a fond parent descends to invert them again. An ordinary island covered with well-grown young Black-backs lying in pairs and trios with their legs in the air and their eyes all straining to keep the visitor in sight presents a curious spectacle—and one not found everywhere.

Of the splendid Caspian Terns this region can boast only one small colony of about thirty pairs. It is delightful to band their trim children, while the strong, sharp-billed parents hurl themselves repeatedly at one's head, like fire-tipped missiles from the vault of heaven, and come within an ace, apparently, of tearing one's eyes out. Few can

regard their spirited onrush without flinching. It is better to disregard them and keep one's eyes on the young bird in the hand, but one cannot help hearing the unfriendly remarks they make, which seem strangely harsh for so fine a bird.

These islands have another feathered inhabitant whose appearance is equally pleasing and whose voice is even more weirdly coarse, namely, the Red-throated Loon. It is characteristic of most lovers that they try to make their voices as pleasant as possible, but the sounds which are produced by Red-throated Loons at courting time are such a medley of squawks and howls and unnameable noises as to give the impression that a very dance of the devils must be in progress. Soon after hatching, their young leave the nest for the small pond beside which it is situated, and there they must remain until they can fly. They can be caught, however, by means of a net or seine, which should be five or six feet wide and forty to sixty feet long, with floats along the upper edge and weights along the lower. This seine must be operated by two persons, one on each side of the pond.

The members of the Alcidae which nest along this coast are particularly interesting subjects for bird-banding, as the adult birds may often be caught in their places of incubation. Let us go for a few minutes on a bird-banding expedition to St. Mary Islands Bird Sanctuary, which consists of six rocky, moss-covered islands eight miles out at sea. Here is the home of thousands of seabirds, including Guillemots, Auks, Puffins, and Murres. Each one of us armed with a long slender stick, selected from the driftwood, we sally forth to where these birds have their homes, some times under boulders, sometimes in large or small clefts in the solid rock.

The Guillemots are delightful little birds, like black and white butterflies; although they are of gentle disposition, they sometimes peck harmlessly at our hands when they are being banded. We poke them out from their refuges and band partly grown young more often than adults.

The Razor-billed Auks or Tinkers are creatures of quite different mettle. When disturbed in their homes, they display the ferocity of despair. Their powerful, sharp-edged mandibles are capable of inflicting painful wounds and are used with speed and skill. Woe to the bird-bander who thrusts a bare hand carelessly under a rock, thinking to grasp a Guillemot or a Murre, and finds an old Tinker there! When finally caught, these Auks growl like angry dogs and never cease to watch for a chance to strike a blow for freedom. Most of the Auks banded are adults.

The Puffins may look like clowns, but they are quite the most resourceful and attractive of the

Alcidae of this region, and the most dangerous when attacked. They have long, sharp, curved claws, with which they scratch like cats, and the great power with which they can close their big scarlet beaks enables them to cut a finger to the bone when they get a fair chance. Unlike the growling Auks, they seldom say anything when cornered, but in silence make the most of their opportunities for escape, with a self-reliance and resourcefulness which command our admiration. We do not destroy their burrows in order to band them, but capture only those adult birds which we find incubating like Auks, under boulders and in crevices in the rock.

But far the most exciting bird-banding on these favored islands is the banding of adult Common Murres. These birds are gentle, with beaks too weak to bite us, and they are confiding to the point of foolishness. They are incubating in great clefts in the bed-rock, where sometimes hundreds are gathered in one place. The floor of their cavern is covered with an inch or two of greasy filth, with here and there shallow pools of water, and on the rocky walls unpleasant little bird-ticks lie in wait. We rush up to the entrances at top speed, while the Murres cry nervously, "*Arruhk! arruhk!*", and each one tries to shift away from us without relinquishing its grasp on the single great egg between its feet. Who will lie flat in the rich ooze and crawl in to catch what Murres he can and drive the others out? A hardy volunteer plunges in, and to him the world becomes a wild confusion of whirring wings and flying mud, while to us, without, he himself is nothing but two upturned boot-soles and a series of muffled ejacula-

tions. But we have no time to look at him, for the Murres, abandoning their precious eggs for the moment, come pouring out from the rocks everywhere. They are slow and awkward in taking flight, and yet adept at dodging and we rush wildly about, seeking to accumulate an armful of them. Be careful not to get in the way of those which do succeed in flying. Last summer an assistant held out his hand to stop such a Murre and was struck fairly in the back of the hand. That long, pointed beak, with all the speeding bird's momentum behind it, made a great round, red hole, and would have penetrated quite through the hand if the bones had not been too close together.

Five or six Murres make a comfortable armful, as long as you do not let them stab your chin. A bright assistant has been known to pile the Murres like cordwood in a corner of the rocks and try to hold 25 or so of them there with his two hands until they were wanted. But the birds objected and insurrection after insurrection caused the escape of many, and the black flies came and fed upon him while his hands were fully engaged until he streamed with gore. O Science! What sacrifices are made in thy name!

But all the discomforts are forgotten and we receive the rich reward that sooner or later comes to every bird-bander when we seize the last Murre's leg to band it and find there a grimy ring reading: "204713 notify Biol. Surv., Wash. D.C." Banded two years ago in this same crack in the rocks! Let the welkin ring! And then let's move on to the next crack.

CHANGES IN THE STATUS OF CERTAIN ANIMALS AND BIRDS DURING THE PAST FIFTY YEARS IN CENTRAL ALBERTA

By FRANK L. FARLEY



IT HAS been my fortune during thirty-three years residence in Alberta, to gather a considerable amount of information regarding conditions relating to the fauna of the partially wooded prairies of Central Alberta as they existed half a century ago. In addition to being of general interest from an historical viewpoint, an element of scientific value should also be attached to the information gained. The writer cannot vouch for the absolute accuracy of all the statements presented here, but he believes the narrators who made this article possible, had no object in being other than truthful in telling of their experiences, and it is certain that their stories are consistent. It is regrettable that so much latitude as to dates of events has been necessary, but under the circumstances this was inevitable.

Many of the famous hunters of the plains have passed beyond, and only rarely is one of these old-timers to be found, who can tell of conditions as they existed here over fifty years ago. There was a vast difference between the ordinary buffalo hunter and the native who was a keen observer of nature in its varied forms. Had these latter been privileged in their younger days to have associated with present-day students of science, they would have become naturalists in the truest sense of the word. Matthew Cook and the Dumont brothers, Peter and Pascal, were children of nature, all natives of the west, and as such made the observation of wild life part of their every-day interests. Matthew Cook was of Scotch origin with a slight admixture of native blood in his veins. He was born about the year 1840 and lived for many

years on the shores of Buffalo Lake, forty miles south of Camrose. The Dumonts were of French-Canadian stock and they as well had a share of the sturdy native blood. They were born between 1850 and 1860, and lived all their days along the Battle River. All three carried on freighting as their occupation, which took them many times over the old trails, between Winnipeg and Edmonton. Trading and trapping were included in their activities. Fortunate indeed was the man who, in the years when they had retired from a strenuous life that required a stout heart and hard muscles, could draw these men into a conversation about their experiences along the trail, or on the hunting ground. From them a valuable record has been obtained by way of narrative, but it is significant that the accounts of all three coincide, although given at different times.

According to them, Buffalo were plentiful in all the country on both sides of the Battle River until 1875, after which their numbers decreased rapidly. The valley of Meeting Creek, now a prosperous farming district, was a favorite hunting ground for the shaggy monarch of the plains, and it was there that the Blackfeet Indians from the south, and the Crees from the north, met in their regular hunts. The creek derived its name on that account. At times when no buffalo were to be found in the valley, the hunters would move on thirty miles to the south-east, where they were always reasonably sure of locating them along the Red Willow Creek.

Elk, or Wapiti, could be found in considerable bands where there were large areas of wooded country, and surrounding Little Beaver Lake there are still evidences of such areas. The Dumonts claimed that many elk were killed there until 1880. At the present time, elk are not uncommon in a strip of country near the old settlement of Victoria north of the Saskatchewan River, but they have disappeared from the south side of the river. Black-tail Deer were everywhere numerous in the woodlands. They have become very rare during recent times in this territory, but with a closed season for five years, the writer believes much of the country would be re-stocked with this fine animal. A hunter named Joe Monroe is said to have killed fifty-five deer during the winter of 1893-94, along the Red Deer River, just south of Buffalo Lake.

The Dumonts killed moose in the vicinity of Dried Meat Hill, twenty miles south-east of Camrose. Moose were commonly taken in the timbered country surrounding the Hay Lakes, where an occasional one is still reported. Antelope ranged the open country north of the Big Bend of the Battle River about 1880, and the last of these animals observed there were a male and female in 1903, about four miles west of Flagstaff Hill.

Prairie Dogs were fairly common in that same territory at that time, but disappeared shortly afterwards.

Timber Wolves were common when the buffalo inhabited the country. The Dumonts tell of poisoning seven wolves, three red foxes and five coyotes in January, 1872, on Dried Meat Lake, where the creek of the same name empties into the lake. They used for their purpose the carcass of a horse which had been treated with strychnine. For the pelts of these animals they received the following prices: wolves \$3; foxes \$1; and coyotes, 50 cts. each, all in trade.

Grizzly Bears were occasionally met with in the coulees along the rivers, before the country was settled. Between 1870 and 1880, the Dumonts, with their uncle, dug out a den of four two-year-olds, and an aged Grizzly, all of which they killed. This happened late in the fall at the junction of the Beaverdam Creek and the Battle River. About fifty miles north of this location there is a creek known as Grizzly Bear Coulee, and this, without doubt, received its name through some connection with the Grizzly.

Caribou were not known so far south, but Pascal Dumont saw them north of the present site of St. Paul de Metis, about midway between Frog Lake and Lac la Biche. The writer found caribou antlers, apparently very old, some distance north of that vicinity in 1919.

The appearance of the Magpie in large flocks in this section of the province during the last ten years has been the cause of much discussion. Until 1907, they were unknown north of the Red Deer River. In October of that year the writer observed a pair about six miles north of the town of Lacombe. The following year magpies were reported from the vicinity of Bittern Lake, and from then on, they have gradually become more numerous, until at present they are our commonest winter resident bird. Magpies were very numerous during the buffalo days, when flocks would follow the hunting parties and live on the refuse of the hunt. The bird was considered a great pest in those times on account of its habit of alighting on horses, with saddle or harness galls, and persistently pecking at the sores until the death of the animal resulted. The only means of saving the horses when thus attacked was to stable or blanket them. With the extinction of the buffalo, the magpies disappeared and the present incursion is the first which has occurred since that time.

Passenger Pigeons were very common and appeared in immense flocks up till about the year 1875, when they gradually disappeared. The Dumonts often trapped them, as they were considered a great table delicacy. Pigeon Lake was named due to the large numbers of these birds

which nested in the woods surrounding the lake.

Little wonder, then, that this country of rich grasses and vetches, watered with many lakes, rivers and springs, was known throughout the world as a hunter's paradise. All kinds and conditions of men from every part of the world struggled against terrible odds to gain admittance. Some were successful, others, who could not surmount the difficulties, turned back. With the coming of the railroad, a change took place, and

one of the most fruitful agricultural portions of the American continent has replaced what is generally accepted to have been the world's greatest hunting ground.

This transformation has been gradual and perhaps unnoticed by many of the hardy settlers who have carved comfortable prairie homes on its rich surface. But the animals which were hunted, partly for food, for their furs, or for sport, have gone, and their passing has almost been complete.

BIRD-BANDING REPORT FOR MAY-JUNE-JULY, 1925 **"Mavisburn" Banding Station, Millbay, V.I., B.C.**

By G. D. SPROT



HAT I have good reason to believe that Crows have cleaned my station of nestlings for this season may be judged by the following remarks.

Since first taking up banding, I have always had one or two pairs of Steller's Jays nesting on the place, and, excepting on one occasion, I have had no reason to suspect them of breaking up the homes of other birds. The occasion I write of was in 1924, when, on visiting a Band-tailed Pigeon's nest for the second time, I found the egg removed, the Jay's nest being close to it.

In 1924, excepting February, my record banding months were June and July. This year, from the numbers of old birds collecting nesting material, it certainly promised to be an equally good season. However, few birds were seen after the second week in June, and until this was written, August 8th, only three young Juncos together with the male parent, visited the traps. Californian Partridges, which do not start incubation until the end of June, a pair of Russet-backed Thrushes almost as late, and such birds as Woodpeckers, Chickadees, Seattle, and Western Winter Wrens that build in holes, however, raised their broods as usual.

From the above it will be seen that on account of those only that build in holes, and those that hatch late, having raised their young there is little else for me to do but lay the blame of the scarcity of other and more common species on the heads of the Crows, especially also, after the experiences I am about to relate.

In September, 1923, I banded a Steller Jay, 260,902. Constantly repeating since, and nesting close by in 1924, I considered his record sufficiently interesting to warrant his preservation. This year he selected a site for the nest about a hundred yards from the house, and all went well until the young were almost fully fledged—young

Crows were on the wing by the first week in May.

Late on the evening of the fourteenth of May a terrific disturbance in Jay-land called for an investigation, but, being almost dark, only the shadowy forms of two very agitated Jays could be made out close by the nest. The nest was well hidden in a thickly branched fir tree surrounded by others equally thick, and over-shadowed by a large maple, and this was the first knowledge I had of its whereabouts, so that I could hardly be accused of giving away its position, nor could a Crow have located it except by a careful hunt through the bushes. On visiting the spot on the morning of the fifteenth, a young Jay was found dead not far from the nest. It was thought wise to examine the nest, and on finding four young still unhurt the opportunity was taken to band them.

Within an hour, further shrieks from 260,902 and his mate sent us dashing off again in the direction of the nest, where we arrived in time to see a young Jay being carried off in the bill of a Crow. Although closely pursued by the Jays as well as ourselves, the Crow showed no signs of labouring under the weight of the spoil, but the density of the underbrush hindering its flight, the Jay was dropped, falling into the stream, where it was drowned.

No further attack was made that day, but on the following day, May 16th, an S.O.S. from 260,902 got me out of bed at 5 A.M. and, armed with a gun, I was soon in the thick of it. This time the raid was made in force and two Crows were secured before quiet was restored. It was not thought advisable to visit the nest, but it was watched from a distance and about 11 A.M., 260,902 then on guard on the top of the maple tree, signalled down that the advance guard of the Crow army was in sight, and he pluckily sallied forth to meet them. Picking up the gun, I was in time to keep off the marauders; one nose-

dived, the remainder scattered back to the sea shore.

On the 17th, I had made arrangements for a mountain climb and did not return until late in the evening, and as all seemed quiet around the nest on the morning of the 18th, the nest was examined and one dead Jay was all that was found. The parents were still present, but being kept on guard, probably this young bird was starved. I hoped that the Crows would now leave us in peace, but late on the same afternoon a Crow was seen silently making its way towards the nest but, seeing me approach, it broke covert, making a fourth dead Crow.

On the 19th, Crows were constantly seen hunting through the underbrush, and one being seen on the lawn, a Lutescent Warbler's nest on the edge of it was inspected, which had newly hatched young the day before; it was empty.

I am well aware that the Jay wears no halo when it comes to egg-lifting, but the damage done by the Jays in this area is naught as compared to the Crow, nor does the Jay make a business of nest hunting as does the Crow. Whilst beating

up their "game", Crows are very stealthy in their movements, flying low over the bushes, almost "creeping" through the air. Settling every now and then, they appear as if listening, when woe betide the young that call for food. On the 20th and 21st I watched Crows systematically beating up and down through the woods on a broad front, and there was no doubting their intentions. So silently did they move along, that despite the fact that the Jays were very much on the alert, a Crow would often reach the nest unperceived by them.

One could not but admire the plucky efforts of these Jays to protect their young, nor could one but enjoy watching 260,902 as a Crow dropped to the gun, show no sign of fear at the report, but slip from his perch on the top of the maple tree and, with wings closed, dart past like a Kingfisher in an endeavour to strike its enemy before touching the ground.

It is very noticeable that Jays are taken little notice of by small birds, all feed together amicably at the traps, but the appearance, or even the shadow or notes of the Crow has the same effect as would those of a hawk. Sufficient proof surely.

FISHES AND MARINE INVERTEBRATES COLLECTED DURING THE CRUISE OF THE "ARCTIC" IN 1923

By FRITS JOHANSEN

BEFORE Mr. J. D. Soper, who, as naturalist, was attached to the staff on board the C.G.S. *Arctic* on its cruise in the eastern part of the Canadian Arctic in 1923, left on the trip, I supplied him with instructions and equipment for the collecting of fishes and marine invertebrates, when opportunities presented themselves. Considering that the main purposes of the cruise were non-biological, he did very well indeed; and besides a number of plants, mammal and bird skins and Eskimo specimens, he also brought back in the fall, some fishes and marine invertebrates, secured by plankton-hauls from the ship, and by shore-collecting. These latter I received for the purpose of sorting them out and having them identified by specialists, determining the fishes myself. (A detailed description of the fishes will be found in my account of the fishes of Arctic America, to be published in *Rep. Can. Arct. Exped. 1913-18*, Vol. VI, Ottawa.) Of the invertebrates, only the Crustacea and Pteropods have so far been identified, and therefore, there will be further notes on the others. The determinations follow:—

PTEROPODS

(Identified by Dr. W. H. Dall, U.S.N.M., Wash., D.C.)

(1) Strait of Belle Isle (off Point Norman, Newfoundland), July 16th, 1923, Surface (water-temperature 40°F.): 3 *Clione borealis*, Phipps.

(2) Davis Strait, 50 miles south of Disco Island, W-Greenland (on the meridian of Disco), about Lat. 68°N., July 29th, 1923, Surface (water-temperature 42°F.): 1 *Clione borealis*.

(3) Melville Bay (Baffin Bay), about 35 miles south of Cape York, N.W. Greenland, lat 75°N., long. 47°W., August 4th, 1923, Surface (water-temperature 41°F.): 2 *Clione borealis*.

MARINE COPEPODS

(Identified by Prof. A. Willey, McGill University, Montreal.)

(1) Point des Monts, N. side of Gulf St. Lawrence, Que., July 11th, 1923, Surface (water-temperature, 45°F., air 46.5°F.): 1 *Psammathe longicauda* Phil. (immature):

(2) Attached to floating algae (*Fucus* and *Ascophyllum*) in Davis Strait, lat. 63°N., long. 55°W., July 25-26, 1923, surface (water-temperature, 46°F.): Several *Halithalestris croni* (Kroyer) (females with eggs).

(3) Attached to floating *Fucus* in Davis Strait, about lat. 65°30'N., long. 55°W., July 27th, 1923, surface (water temperature, 44°F.): Several *Halithalestris croni* (females).

SCHIZOPODS

(Identified by W. L. Schmitt, U.S.N.M., Wash., D.C.)

(1) From stomachs of two Rock-Cods (*Gadus ogac* Rich.), Godhavn, Disco Island, W. Greenland, July 30th, 1923: Several *Mysis oculata* (Fabr.).

AMPHIPODS

(Identified by C. R. Shoemaker, U.S.N.M., Wash., D.C.)

(1) Locality, etc., as Marine Copepods (2): Two *Euthemisto* sp.

(2) Davis Strait, lat. 63°N., long. 55°W., July 26, 1923, surface: One *Gammarus locusta* (Linn.).

(3) From stomachs of Sculpins (*Myoxocephalus groenlandicus*), Gready Island Harbour, east coast of Labrador (lat. 54°N.), July 19th, 1923: *Gammarus locusta* and *Pseudalibrotus litoralis* (Kroyer).

(4) Locality, etc., as (3); but from stomach of *Gadus ogac*: *Caprella septentrionalis*, (Kroyer), *Gamarellus homari* (Fabr.), *Pseudalibrotus litoralis*, *Metopa* sp.

(5) From stomach of sculpin (*Oncocottus quadricornis*), Ponds Inlet, N.E. side of Baffin Island, Sept. 1-2, 1923: *Pseudalibrotus litoralis*.

(6) Locality, etc., as Schizopods (1): *Caprella septentrionalis*.

DECAPODS

(Identified by M. J. Rathbun and W. L. Schmitt, U.S.N.M., Wash., D.C.).

(1) Locality, etc., as Pteropods (3): One *Hymen-*

odora glacialis Buckh. (female with half a dozen, deep-rosa eggs).

(2) Locality, etc., as Amphipods (3): *Hyas coarctatus* Leach.

(3) Locality, etc., as Marine Copepods (2): One zoea-larva of Decapod (crab?).

FISHES

(Identified by Frits Johansen, Ottawa, Can.)

(1) Antlered Sculpin (*Gymnocanthus [Phobetor] ventralis* Reinh.): a 22 mm. long post-larva from stomach of *Gadus ogac*, Godhavn, Disco Island, W. Greenland, July 30th, 1923.

(2) Four-horned Sculpin (*Oncocottus quadricornis*, Linn.): a 20 cm. long female with eggs; from Ponds Inlet, Baffin Island, September 1-2, 1923.

(3) Great Greenland Sculpin (*Myoxocephalus groenlandicus* Cur. and Val.): two females, 31 and 29 cm. long, and two males, 27 and 29 cm. long, all from Gready Island Harbour, Labrador, July 19th, 1923.

(4) Rock-Cod or Greenland Cod (*Gadus ogac* Rich.): a 40 cm. long male from Gready Island Harbour, Labrador, July 19th, 1923; and two 33 and 34 cm. long males from Godhavn, Disco Island, W. Greenland, July 30th, 1923.

Mr. Soper went again north with the *Arctic* in 1924, and remained in Baffin Island, to return to Ottawa in 1926. There is therefore every reason to expect still more valuable collections, also in the line of fishes and marine invertebrates, as a result of his more prolonged stay in Arctic Canada.

SOME NOTES ON CANADA'S SO-CALLED WOOD BUFFALO

By FRED. V. SEIBERT



URING the summer of 1922, I had the pleasure of exploring that area lying between the Peace River, Lat. 59°N. and Great Slave Lake, Lat. 61°N., from the Slave River west as far as Buffalo Lake.

In this region are found to-day (1500 to 2000 or more) the only remnants in a wild state of the millions of buffalo (*Bison Americanus*) which a few decades ago roamed over the great central plains of North America. That these animals have existed in these latitudes from early times and in considerable numbers is evidenced by the reports of practically all the early explorers: Hearne, 1772, Mackenzie, 1789, Harmon, 1808, Franklin, 1825, and many others. All bear witness to the fact that most of this northern country was once inhabited by numerous herds of buffalo as far north as Slave Point on the north shore of Great Slave Lake.

The name "wood buffalo" leads the observer to expect a type of animal somewhat different from

the plains buffalo. Nevertheless they have the same conformation, the wood buffalo, however, being larger and darker. They are without doubt superior in size, weight and stamina to any other herds now existing. These differences may be accounted for by the fact that they have always been wild, and also because of the shelter and good feeding conditions within their range. A specimen of wood buffalo, now mounted and in the museum at Calgary, weighed, when killed, 2,402 pounds. Samuel Hearne's notes of the buffalo he encountered south of Great Slave Lake and east of Slave River in 1772 are worthy of note in this connection. "They are of such amazing strength," he writes, "that they frequently brush down trees as thick as a man's arm; and be the snow ever so deep, such is their strength and agility that they are enabled to plunge through it faster than the swiftest Indian can run on snowshoes." Even when walking with that deliberate and apparently slow tread which is their peculiarity,

the speed of these ponderous animals is most deceiving. A man must run to overtake them.

Excepting during the rutting season, these animals display a gentle, friendly and curious but not particularly timorous nature. When roused, however, to a fighting pitch, they become exceedingly dangerous, rushing at the enemy with irresistible force. Nevertheless, their first impulse on being disturbed is to run, which they do with remarkable rapidity. In some cases, they do not stop until they are at least out of hearing and sight. Others will run merely for fifty or one hundred yards and then stop at the edge of the range of visibility. In these cases, their curiosity overcomes their fear. They face in the direction from which they came and sniff the air for a scent. If they do not scent anything they will often circle until they do, when they will go as fast as ever.

The wood buffalo's sense of hearing does not appear to be acute, neither is his eyesight good. He depends for his protection on his keen scent and on his superior size and corresponding ability to defend himself when forced to do so. His sense of smell is particularly keen. At different times buffalo were observed taking notice of tracks of man and horse a day or two old. On a couple of trips in one locality in the range where the buffalo were numerous, it was later observed that a number of the herds in that district left for a new area. Many of these animals never saw man or horse on these trips but had scented the tracks soon after we had passed and, as a result, had moved to other parts.

During the summer, they are found in herds, usually of from twelve to fifty animals, and quite often singly or in pairs. These herds are composed of the females, calves and younger animals and are accompanied by one particularly large bull who appears to be the leader. This leader, in every case observed, was a majestic, ferocious looking animal, far exceeding the average in height and size. Due, no doubt, to the presence of the females and younger stock, the herds are of a more timorous and restless nature than the individual animals. The individual animals and even pairs during midsummer are practically always bulls and are seldom difficult to approach unobserved. They frequently are found lying down during the warm part of the day when it is quite possible to get within twenty yards and in some cases much closer. One animal was approached to within seven yards, while another was met on an abrupt bend in the trail at five yards and still another at three yards. The general attitude of the individual animals and pairs appears to be that they have little to fear, which goes to show that they are seldom disturbed.

The habits of these creatures are remarkably regular. They generally frequent the same places at similar periods of the year and usually travel the same trails in going from one place to the other. Unquestionably the wood buffalo is without a peer as a trailmaker. I have yet to see a human trail locator who can surpass him in this respect. As this is a quality he holds in common with his brother of the prairies, there is little wonder that many of our national highways follow the paths first laid down by the buffalo.

In almost every respect, his habits are similar to the buffalo of the plains. He delights to roll, which he does in wallows similar to those of the plains. These are places which he has cleared of all sticks, roots and sod or leaves. He particularly loves to roll during July and August, when this gives him relief from the flies. Later, when the flies have gone, he still takes his occasional roll, but he uses these wallows quite extensively for his daily sun-bath and momentary snoozes. Most of these wallows are just large enough for a buffalo to roll in, and yet not a few are large enough to accommodate a whole herd. These later resemble cattle-pens on our western ranches. One such wallow was over six acres in extent.

It is perhaps unnecessary to state that the buffalo's main article of food is grass. He does, however, at times browse on the leaves of the willow and small poplar and occasionally during the winter he will eat caribou moss and the moss hanging from spruce trees. During the spring and summer they seek the dry uplands while in the late fall and winter they subsist on numerous grassy sloughs in which the rank slough grass grows to a remarkable length, often over six feet long. When this is covered with snow, the wood buffalo, like his brother on the plains, "noses" it away even when it is four to six feet deep, as it so often is in that latitude.

The habitat of these animals may be described very briefly as of two kinds. One portion, the summer feeding-ground, is a country of sub-surface drainage, limestone overlying beds of gypsum. In certain parts this sub-surface drainage is on such a scale that it may truly be called a country of underground rivers. The beautiful Nyarling as its name in the native tongue implies, flows for eight or ten miles underground. Numerous other streams exhibit the same peculiarity. Many sink holes, some of them sufficiently large to hold a city block, scattered throughout indicate that this sub-surface drainage extends over a wide area.

In sharp contrast to this type of country is another type which covers a large area. In this portion, drainage is conspicuous by its absence

Numerous grassy sloughs and swamps abound. On the border line between these two types of country are to be found many salt springs.

Wood Buffalo Park, established December, 1922, contains 10,500 square miles and includes all of the known habitat of these animals.

PENNSYLVANIANS VISIT JACK MINER SANCTUARY



SOME fifteen years ago the conservationist sportsmen of Essex County, Ontario, were first advised by Dr. W. T. Hornaday, of the steady progress being made by the conservationists of Pennsylvania. On April 4, 1925, forty-two of Pennsylvania's conservationists, many of them grey-haired pioneers in the work, arrived at Kingsville, Ontario, the chief attraction being a visit to Jack Miner, and the Geese on the Miner Sanctuary.

Mr. Manly Miner was master of ceremonies, and Dr. R. D. Sloane, of Leamington, was official photographer for the party.

The first event was a trip to the shores of Lake Erie by motorbus. Unfortunately the two thousand Whistling Swans that had lingered in the vicinity for three weeks and more had left the day previous, their signal for departure seeming to be a northeast blow. The trip to the lake was not in vain, for more than four thousand Canada Geese occupied the sandbar which lies about four hundred yards off shore in Lake Erie.

The party then went to the Miner Sanctuary, where it was estimated five thousand Geese were feeding in the ponds at the rear and nearly three hundred remained in the front pond. In carrying on motion picture photography, the party found that sixty people could stroll within fifty feet of these Geese, and what was stranger still, that the birds would not fly when cornless cobs were tossed among them. After fifteen or twenty minutes of such friendly intercourse, the Geese left for the rear ponds.

Other points of interest included the tree plantation, where Bob-white finds winter shelter, the great Goose trap where the Geese are caught to be banded, and the great flocks of Geese on the rear ponds. The birds took flight, but did not go

away, merely hovering in the air two hundred feet above their human friends. As soon as the people withdrew the Geese alighted. The story was also told of the six captive Whistling Swans that have been brought back to health and strength after their perilous trip over Niagara Falls two years ago.

As the Geese left to spend the night on Lake Erie, according to their usual custom, the party of visitors proceeded to dinner at Kingsville; and there, Mr. Borland, of Franklin, Pennsylvania, on behalf of the visitors, presented Mr. Jack Miner with a purse of two hundred dollars to assist in his work of feeding and protecting the Geese.

The Pennsylvanians visited the Miner Sanctuary again the next morning at five o'clock, when they viewed the flight of ten thousand Geese coming in for breakfast.

At ten o'clock the party of visitors left Kingsville for home, having first been impressed by Mr. Miner with the desirability for a winter Sanctuary for these birds in North Carolina.

The Essex County conservationists were indeed happy to have had these gentlemen visit them if only for a day, for we have always felt a bond of sympathy with Pennsylvania, especially along conservation lines.

The visitors roundly applauded the work for wild life conservation done in Essex County and approved of the splendid co-operation with the Dominion Advisory Board on Wild Life Protection, and the Dominion and Provincial Game Departments. The advances made should aid in bringing, for Canada and Essex County, improvement in the supply of wild life, and consequently better sport for now and the future.

More power to our friends from Pennsylvania, and may they long work with us for better wild life protection on this continent.

ADDITIONAL RETURNS FROM BIRDS BANDED IN 1924

In the following returns upon banded birds, it will be noted that some returns may be thought to indicate, from the date of capture, violations of the Migratory Bird Act of Canada or the United States. The great majority of returns, which seem to indicate violations, are from birds accidentally caught in traps set for fur-bearing mammals, from birds caught in fish nets, killed by oil, or from birds found dead from unknown causes. Appropriate action has been taken in connection with the few returns which indicate illegal shooting.

(Continued from page 193)

HERRING GULL, No. 236,752, banded by Geo. W. Luther, near DeTour, Michigan, on

July 4, 1924, was killed at the Great Whale River Post, Hudson Bay, Quebec, during the fall of 1924.

HERRING GULL, No. 321,027, banded by F. C. Lincoln, at St. James, Michigan, on July 18, 1924, was found dead on Bead Island, north shore of Lake Superior, Ontario, on September 29, 1924.

COMMON TERN, No. 270,811, banded by W. E. Hastings, in Huron County, Michigan, on July 13, 1924, was killed at Sarnia, Ontario, on September 8, 1924.

COMMON TERN, No. 265,931 banded by E. Beupré, on Salmon Island, Lake Ontario; Ontario,

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on July 19, 1924, was found dead on the same island on August 19, 1924.

COMMON TERN, No. 265,944, banded by E. Beupré, on Salmon Island, Lake Ontario, Ontario, on July 19, 1924, was found dead in Fire Island Inlet, Long Island, New York, on August 27, 1924.

COMMON TERN, No. 265,946, banded by E. Beupré, on Salmon Island, Lake Ontario, Ontario, on July 19, 1924, was found dead on the shore of West Lake, Prince Edward County, Ontario, about September 1, 1924.

COMMON TERN, No. 265,947, banded by E. Beupré*, on Salmon Island, Lake Ontario, Ontario, on July 19, 1924, was found dead on the same island, on August 19, 1924.

DOUBLE-CRESTED CORMORANT, No. 232,010, banded by Reuben Lloyd, at Last Mountain Lake, Saskatchewan, on July 1, 1924, was killed in the same vicinity, on July 27, 1924.

DOUBLE-CRESTED CORMORANT, No. 232,050, banded by Reuben Lloyd, at Last Mountain Lake, Saskatchewan, on July 1, 1924, was killed at a place five miles south-east of Van Buren, on Flat Rock Creek, Arkansas, on November 3, 1924.

MALLARD, No. 313,101, female, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on July 1, 1924, was shot near Gaston, Oregon, on November 9, 1924.

MALLARD, No. 313,104, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on July 12, 1924, was shot at the same place, during the month of October, 1924.

MALLARD, No. 309,006, juvenile, banded by R. H. Carter Jr., at Muscow, Saskatchewan, on July 13, 1924, was shot at Spirit Wood Lake, North Dakota, on November 5, 1924.

MALLARD, No. 313,105, female, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on July 14, 1924, was shot in the same locality, during the month of October, 1924.

MALLARD, No. 313,108, juvenile, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on July 16, 1924, was shot at a place four miles north-west of Onaway, Alberta, on September 24, 1924.

MALLARD, No. 313,109, juvenile, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on July 16, 1924, was killed at a place sixteen miles south of Rosebud, South Dakota, on November 2, 1924.

MALLARD, No. 313,110, female, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on July 16, 1924, was shot in the same locality, during the month of October, 1924.

MALLARD, No. 313,113, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on July 17, 1924, was killed on the low lands near White River, Gregory, Arkansas, on November 15, 1924.

MALLARD, No. 313,114, juvenile, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on July 17, 1924, was shot in the same locality, during the month of October, 1924.

GREEN-WINGED TEAL, No. 208,336, banded by E. Beupré, at Cataraqui Marsh, Kingston, Ontario, on April 13, 1924, was caught in a muskrat trap and found dead in the same locality, on April 20, 1924.

BLUE-WINGED TEAL, No. 313,102, female, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on July 8, 1924, was killed at a place six and one-half miles south of Donna, Texas, on December 20, 1924.

PINTAIL, No. 202,945, female, banded by J. G. Cunningham and J. A. Munro, on Lulu Island, British Columbia, on April 4, 1924, was shot at Burlington, Washington, about January 15, 1925.

PINTAIL, No. 232,092, banded by Reuben Lloyd, at Davidson, Saskatchewan, on July 6, 1924, was found dead in the same locality, on July 15, 1924—cause of death unknown.

PINTAIL, No. 232,110, banded by Reuben Lloyd, at Davidson, Saskatchewan, on July 10, 1924, was killed at Howard, Kansas, on November 17, 1924.

PINTAIL, No. 232,124, banded by Reuben Lloyd, at Davidson, Saskatchewan, on July 11, 1924, was found dead in the same locality, on July 15, 1924—cause of death unknown.

SCAUP DUCK, No. 297,766, banded by H. S. Osler, at Lake Scugog, Ontario, about April 15, 1924, was shot on Aquia Creek, Widewater, Virginia, on January 15, 1925.

BLACK-CROWNED NIGHT HERON, No. 311,165, banded by R. B. Harding, at Sandy Neck, W. Barnstable, Massachusetts, on June 15, 1924, was shot at Sutton Junction, Quebec, on September 2, 1924.

BLACK-CROWNED NIGHT HERON, No. 311,333, banded by L. B. Fletcher, at Barnstable, Massachusetts, on June 15, 1924, was found dead near a small lake about forty miles south of Lake St. John and about four hundred miles from Barnstable, near Van Bruyssel, Quebec, on August 26, 1924.

BLACK-CROWNED NIGHT HERON, No. 311,605, banded by S. G. Emilio, at Barnstable, Massachusetts, on June 16, 1924, was caught in a trap at Ste. Hedwige, ten miles from Roberval, Lake St. John, Quebec, about November 3, 1924.

BLACK-CROWNED NIGHT HERON, No. 311,647, banded by S. G. Emilio, at Barnstable, Massachusetts, on June 16, 1924, was killed at St. Justine, Bois Blanc, Quebec, about half way, between Quebec and Montreal, on September 16, 1924.

BLACK-CROWNED NIGHT HERON, No. 225,374, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 18, 1924, was shot in Hidalgo County, Texas, on December 1, 1924.

BLACK-CROWNED NIGHT HERON, No. 312,242, banded by Willis H. Ropes, at Ipswich, Massachusetts, on June 22, 1924, was shot at Valcourt Ely, Quebec, about August 15, 1924.

BLACK-CROWNED NIGHT HERON, No. 301,301, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 23, 1924, was founded wounded at a place fifteen miles south of Deerfield, Florida, on November 27, 1924.

BLACK-CROWNED NIGHT HERON, No. 301,306, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on July 4, 1924, was killed at Valley City, North Dakota, on September 21, 1924.

SEMPALMATED SANDPIPER, No. 301A, banded by W. H. B. Hoare, at Pillage Point, Yukon Territory, Arctic Coast, on July 19, 1924, was found dead in the same locality, on July 21, 1924. The bird was too young to fly and was probably chased to death by Eskimo children.

SEMPALMATED SANDPIPER, No. 303A, banded by W. H. B. Hoare, at Pillage Point, Yukon Territory, Arctic Coast, on July 19, 1924,

was found dead in the same locality, on July 21, 1924. The bird was too young to fly and was probably chased to death by Eskimo children.

MOURNING DOVE, No. 264,589, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 12, 1924, was killed by a cat in the same vicinity, on June 30, 1924.

MARSH HAWK, No. 301,756, young, banded by E. W. Calvert for H. S. Osler, at Port Perry, Ontario, on June 20, 1924, was captured at Boonville, North Carolina, on October 16, 1924.

FLICKER, No. 273,579, fledgling, banded by D. A. Matheson, at Leamington, Ontario, on June 8, 1924, was killed by a cat, in the same vicinity, on July 5, 1924.

FLICKER, No. 264,606, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 16, 1924, was found dead at a place one-half mile west of where it was banded, on August 3, 1924.

NORTHERN FLICKER, No. 264,656, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 27, 1924, was found drowned in a horse trough at a place about two miles south-east of where it was banded, on July 25, 1924.

STELLER'S JAY, No. 262,137, juvenile, banded by G. D. Sprot, at Mill Bay, Vancouver Island, British Columbia, on June 12, 1924, was killed in a rat trap at a place one-half mile south of where it was banded, on August 30, 1924.

STELLER'S JAY, No. 262,138, banded by G. D. Sprot, at Mill Bay, Vancouver Island, British Columbia, on June 12, 1924, repeated at the same station on September 17, 1924, and was killed in the act of egg stealing in a chicken house at a place one-half mile north of where it was banded, on October 17, 1924.

STELLER'S JAY, No. 262,139, juvenile, banded by G. D. Sprot, at Mill Bay, Vancouver Island, British Columbia, on June 14, 1924, repeated at the same station on June 18, 1924, and was killed in a poultry house at a place one-half mile north of where it was banded, on November 28, 1924.

CROW, No. 225,388, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 23, 1924, was killed at Lexington, Oklahoma, on January 21, 1925.

BRONZED GRACKLE, No. 213,732, adult, banded by G. W. Knechtel, at Kitchener, Ontario, on April 19, 1924, was found dead at a place about three-quarters of a mile from where it was banded, on July 1, 1925.

BRONZED GRACKLE, No. 19,444, adult female, banded by Ralph E. DeLury, at Dow's Lake, Ottawa, Ontario, on May 1, 1924, was shot at a place about two thousand feet from where it was banded, on May 17, 1924.

BRONZED GRACKLE, No. 113,354, male, banded by Hoyes Lloyd, at 406 Queen Street, Ottawa, Ontario, on May 2, 1924, was found dead in the back yard of 407 Queen Street, Ottawa, Ontario, during the month of October, 1924.

BRONZED GRACKLE, No. 268,586, adult female, banded by G. W. Knechtel, at Kitchener, Ontario, on May 8, 1924, was shot at a place about one-half mile from where it was banded, on May 20, 1924.

BRONZED GRACKLE, No. 268,587, adult male, banded by G. W. Knechtel, at Kitchener, Ontario, on May 8, 1924, was shot at a place

about one-half mile from where it was banded, on May 20, 1924.

BRONZED GRACKLE, No. 268,137, banded by Reuben Lloyd, at Davidson, Saskatchewan, on July 10, 1924, was killed in the same locality, on July 27, 1924.

BRONZED GRACKLE, No. 293,468, banded by Reuben Lloyd, at Davidson, Saskatchewan, on July 12, 1924, repeated at the same station, on August 8, 1924, and was killed by a cat, in the same vicinity, on August 20, 1924.

TREE SPARROW, No. 88,205, banded by Reuben Lloyd, at Davidson, Saskatchewan, on April 21, 1924, was found dead at the same place, on April 23, 1924.

CHIPPING SPARROW, No. 97,106, young, banded by Nelson T. Jones, at Port Stanley, Ontario, on June 25, 1924, was found dead at the same place, on June 27, 1924.

ROBIN, No. 69,928, fledgling, banded by W. E. Hurlburt, at Toronto, Ontario, on May 24, 1924, was found dead in its nest the next day.

ROBIN, No. 216,004, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 7, 1924, was found dead at a place one mile east of where it was banded, on July 24, 1924.

ROBIN, No. 216,005, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 7, 1924, hit a telephone wire, and was found dead, at a place about one-half mile from where it was banded, on August 8, 1924.

ROBIN, No. 264,566, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 7, 1924, was found dead at a place about one-half mile from where it was banded, on June 18, 1924.

ROBIN, No. 72,858, fledgling, banded by Claude E. Johnson, at Ottawa, Ontario, on June 8, 1924, repeated at the same station on June 20, 1924, and was picked up dead in the same vicinity, on July 2, 1924.

ROBIN, No. 72,859, adult, banded by Claude E. Johnson, at 87 Cameron Street, Ottawa, Ontario, on June 8, 1924, was found dead near No. 1 Osborne Street, Ottawa, Ontario, on September 23, 1924. The bird had apparently died some time before its recovery.

ROBIN, No. 264,579, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 9, 1924, was found dead at a place one-half mile east of where it was banded, on June 20, 1924.

ROBIN, No. 72,863, juvenile, banded by Claude E. Johnson, at Ottawa, Ontario, on June 13, 1924, was re-trapped at the same station, on June 18, 1924. The bird was in a very weak condition and appeared to be suffering from intestinal trouble of some sort. It expired in the evening.

ROBIN, No. 264,641, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 24, 1924, was found dead at a place about one-quarter mile from where it was banded, on June 30, 1924.

ROBIN, No. 264,642, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on June 24, 1924, was killed by a cat in the same vicinity, on June 30, 1924.

ROBIN, No. 264,686, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on July 5, 1924, was killed by hitting a telegraph wire at a place about two miles south of where it was banded, on July 28, 1924.

ROBIN, No. 264,707, fledgling, banded by George Lang, at Indian Head, Saskatchewan, on July 12, 1924, was found dead at Kennedy, Sask-

atchewan, ninety miles south-east of where it was banded, on July 26, 1924.

(To be continued)

NOTES AND OBSERVATIONS

TUFTED TITMOUSE AT HAMILTON, ONTARIO.—On the afternoon of May 28, 1925, while watching birds from the veranda of our home at 96 West Second St., Hamilton, (on "the Mountain"), I noticed a movement among the leaves of a maple tree about twenty feet away, and turned my 6X prism binoculars on the spot, expecting to see a Warbler. At first I could see only part of the bird because of intervening leaves, and could note only a light grey belly with a faint rusty streak along the sides. Then the bird moved into plain view, and I was delighted and surprised to see that it was a Tufted Titmouse, (*Bæolophus bicolor*). As the bird remained in that and another maple tree for about two minutes, I had several clear views of it with the glasses at distances of from twenty to thirty feet, and noticed the grey colour, lighter below, and saw the crest distinctly. I had not previously seen the species in life; but I had previously seen the specimens taken on Point Pelee, which are in the possession of Mr. W. E. Saunders. I know of no other record for this species for this district, and, indeed, think that this is only the second Canadian record.—R. OWEN MERRIMAN.

A STARLING NESTING AT HAMILTON, ONTARIO.—On May 5, 1925, Mr. W. M. Paterson and the writer noticed a Starling, (*Sturnus vulgaris*) enter a cavity in a willow tree with a dark coloured object in its bill, and leave a moment later carrying a light coloured object. We took up a closer position, and waited for about half an hour; but the bird did not again go to the tree, though it circled about us at a distance, watched us for some time from small willows on the banks of a creek twenty yards away, and alighted on and pecked among a dump of hair which had been carted from a distant slaughter house to the banks of this creek. The offensive odour of this dump was very noticeable at the nesting tree.

On May 18, Mr. Paterson and the writer revisited the tree. Knocks on the trunk brought no sound or sight of the occupants, and Mr. Paterson climbed to the entrance of the cavity. As he began to probe the cavity with a stick to determine its depth, a nestling Starling left the nest and fluttered to the ground about ten feet from the foot of the tree. It was captured unhurt, and has been sent in the flesh to the Victoria Memorial Museum, Ottawa. Its general colour was brown, completely feathered, with a few traces

of dark down clinging to the feathers of the head; Bill, feet, and iris were dark, the edges of the bill and corners of the gape being bright yellow. The wings were well developed; but the tail was less than one inch long.

Further probing of the nesting cavity seemed to show that one or more nestlings remained within; but they could not be induced to leave the nest, to show themselves, or to make a noise, and the interior of the nest could not be reached. The adult birds were not seen on this visit to the nesting site.

The willow tree containing the nest stands by itself in an old pasture field which has been surveyed for building but in which few houses have yet been erected and none within three hundred yards of the tree. It is about half a mile south of the edge of the "Mountain", which is here the limit of the city of Hamilton, and a few hundred yards west of the much-travelled Caledonia Road. The fork of the tree trunk containing the nest is about five feet in circumference at the entrance to the cavity. It leans to the north; and on the side of the nesting cavity it has neither branches nor leaves for twenty feet from the ground, but on the other side there are small, leafy branches above and below the nest. The entrance to the cavity is a nearly circular knot-hole, two and a quarter inches in diameter, eleven feet from the ground, and about one-third the height of the tree. The cavity, as probed with a stick, is fifteen inches deep. Its entrance faces a little south of east.

On the occasion of our first visit to this nest, we saw a flock of ten or more Starlings a few hundred yards from the nesting site. Starlings are reported to be nesting in several church and school towers in Hamilton and in hollow trees near the city; but the writer has not been able to confirm these reports. At least one report (which was not confirmed) was received of Starlings nesting in this district in 1924. The frequency with which the species has been met with in and near the city during the past year makes it probable that it bred here in 1924, and possibly, but less probably, in 1923 also.—R. OWEN MERRIMAN.

CORRECTION.—In L. B. Potter's article entitled "Notes on Winter Birds", which appeared in the May issue, "Rusty Black-birds" should have read "Redwings".—Editor.

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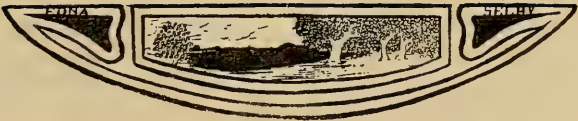
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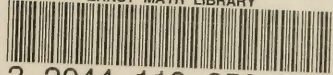
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